REPORT RESUMES

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IMPACT OF SUMMER 1965 HEAD START ON CHILDREN'S CONCEPT
ATTAINMENT DURING KINDERGARTEN. FINAL REPORT.
BY- ALLERHAND, MELVIN E.
WESTERN RESERVE UNIV., CLEVELAND, OHIO
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THIS STUDY EXAMINES THE PROGRESS OF 125 CHILDREN IN THE CLEVELAND PUBLIC SCHOOL KINDERGARTENS WHO ATTENDED HEADSTART DURING THE SUMMER AND 125 CHILDREN IN THE SAME SCHOOLS WHO DID NOT ATTEND THE HEADSTART PROGRAM. SOME INDICATIONS IN THIS STUDY SUGGEST THAT A HEADSTART CHILD SHOWS MUCH GREATER VARIABILITY IN HIS CONCEPTUAL DEVELOPMENT THAN A NON-HEADSTART CHILD. HE ALSO TENDS TO PERFORM BETTER IN THE AREAS OF COLOR AND FORM DISCRIMINATION AND POSSIBLY GROUPING WHEN HE IS IN A NON-HEADSTART TEACHER'S CLASS. IN A HEADSTART TEACHER'S CLASS, THE HEADSTART CHILD SEEMS TO ACHIEVE IN THE MORE ORGANIZATIONAL AREAS, AS BEST REFLECTED IN INCREASED VERBAL FACILITY IN THE TIME SEQUENCE AND ORDERING CONCEPTS. THE RESULTS OF THIS STUDY RAISE THE QUESTION OF WHETHER THE IMPACT OF A STIMULATION EXPERIENCE CAN BE MAINTAINED. FOLLOWUP STUDIES AND EVALUATION OF DEMONSTRATION PROJECTS REPORT THE PHENOMENON OF THE DECREASING DIFFERENCE OF SUCCESS BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS. (CO)

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FINAL REPORT[1]

Impact of Summer 1965 Head Start on Children's Concept Attainment during Kindergarten

by
Melvin E. Allerhand, Ph.D.
Director, Division of
General Studies and
Associate in Psychology
Western Reserve University
Cleveland, Ohio

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An Abstract

This follow-up study examines the progress of a group of 125 poverty youngsters (HS) who had experienced Head Start during the summer of 1965 and a group of 125 children (NHS) in the same approximately 25 Cleveland Public School Kindergarten classrooms. In addition to cross sectional pre- and post-testing, concept attainment was measured through periodic observations in the classrooms. Ratings were made on five concepts; viz., color, form-space, grouping, ordering and time. The teacher variable was viewed in terms of experience as a HS teacher.

It is quite evident that the HS child has responded very favorably to the stimulation that he received during the summer Head Start experience. In almost all instances, whenever there are indications of higher level performance during kindergarten, the HS group continued to be out in front of the NHS group. However, the impact as reflected by cross-sectional testing, demonstrates that as a group the HS children were not able to maintain the accelerated pace initiated through the summer experience. A subgroup of about 25% of the HS sample seemed to retain the positive impact and were consistently high kindergarten performers.

Some of the indications in this study suggest that the HS child shows much greater variability in his conceptual development. The pattern of these spurts and regressions may indicate a stronger orientation for growth. Further, the HS child seems to have shown more responsiveness to the educational event which includes reactions to his teacher.

The HS teacher status does not seem to have any overall effect in increasing the functioning of the children in her class. However, there is an indication that the HS child tends to perform better in the areas of color and form and possibly grouping when he is within the NHS teacher's class. In the HS teacher's class, the HS child seems to achieve in the more organizational areas which is best reflected in increased verbal facility in the time sequence and ordering concepts. Thus, there is the suggestion that the NHS teacher may have emphasized the color and form-space areas (skills) and the HS teacher made additional demands in the time sequence and ordering areas (organizational-verbal). These conclusions are highly tentative and would require further study.

The teachers' ratings show a bias toward positive change in that they tend to use higher levels on the rating scales than the observers. This is quite consistent with the findings in other research, i.e., the person who does the job will want to see more positive change in his charges, clients, etc. and, therefore, will rate in that direction.

The results of this study raise the question of the maintenance of the impact of a stimulation experience. Follow-up studies and evaluation of demonstration projects report the phenomenon of the gradually decreasing gap of success between the experimental and control groups. This study, in part, presents a consistent picture. However, special emphasis is directed to the approximately 25% who were highly responsive to the stimulation of the summer. It may be that this more responsive child is brighter or at least can retain the better educational orientation achieved through the summer experience. He seems to conform to the particular emphasis of the teacher.

The greatest amount of change in the total group was seen in the development of the color concept and probably the next most in the areas of grouping and ordering. The form-space concept seems to be more related to constitutional factors and possibly for this age group sustained changes through stimulation should not be expected. Although placing demands on the child did produce higher performance in the form-space area, the increased functioning was sustained only when there was continuous reinforcement. This finding was mainly suggested by the lowered functioning in the form-space concept after periods of long absences from school, such as during winter and spring vacations.

Generally speaking, girls appear to be higher concept attainers during the kindergarten period. There was only one instance (grouping during November-December rating) of males showing significantly higher attainment. In color, form-space, time sequence and duration, the girls showed higher achievement at certain times during kindergarten. Even in grouping, during the February rating the girls surpassed the boys. It should be recognized that the basis for this higher level of success was not examined in this study.

Finally, this study suggests that children, at least those coming from poverty areas, are able to function at the following levels by the time they have completed kindergarten:

A. In the color area, they can achieve the level of naming colors on request.

B. In the form-space area, they can achieve at the level of delimiting of space using objects and line.

C. In grouping, they are able to establish logical groupings according to the context of the material.

D. In the ordering area, they can achieve at the level of rank ordering of a set of objects on a personally determined dimension.

An Abstract (Cont.)

E. In the time area, the children have been able to learn to follow the teacher's established order within a single class event and also seem to make some minimal adjustments in activity related to certain time demands.

To summarize, the Summer Head Start experience clearly increased the children's level of achievement as measured at the end of the summer program and during the first few months of kindergarten. The differences that were seen beyond such a period were evidently produced by a more responsive 25% of the HS group. Head Start seems to establish a more positive orientation to learning within the school situation. The orientation is more clearly retained by the more responsive and/or possibly more conforming group.

I. Introduction

The effort involved in this Head Start Operational Field Analysis was actually divided into two parts. The first phase of this endeavor was the coordination of the Greater Cleveland Area psychological assessment for Operation Head Start 1965. The results of that effort are detailed in Progress Report I. It may be sufficient to say that approximately 4,500 children were enrolled in five different Head Start Programs and fifty testers were trained to administer the pre- and post-tests including 2,574 Pre-School Inventories and 473 Peabody Picture Vocabulary Tests.

The remainder of this report will be a detailed discussion of a follow-up study which examined the concept attainment of 125 Head Start (HS) and 125 Non-Head Start (NHS) children who entered the Cleveland Public School kindergarten classrooms in September, 1965. The central question was: Do children who experience a summer stimulation experience perform in a manner that would be considered significantly different from a like group of children who do not have such a stimulation experience? A closely related question about teacher approach was only tangentially examined. Does the fact that a teacher has worked in the HS Summer Program have an impact on the level of performance of the kindergarten children in her classes?

Although the two questions are the central ones in this particular research program the following additional elements were studied:

1. the effectiveness of parents of HS children as administrators of psychological tests.
2. the stages of concept attainment by children living in economically deprived areas.
3. the relationship between concept attainment and sex of subject.
4. the relationship between concept attainment and age of subject.

II. Population and Sample

As indicated in the introduction there were 4,500 children enrolled in the Cleveland HS Program of 1965. It was determined that the enrollment in the Cleveland Public Schools kindergartens in 1965 was 7,550. Therefore, about 58% of the potential kindergarten attenders were enrolled in the 1965 Summer HS Program.

A. Sample

The HS sample of 125 was selected primarily from eight sample centers[1] determined by the United States Census Bureau in their census tract sampling approach used for the Head Start Project. The 125 Non-Head Start children were randomly chosen from the same group of kindergarten classes attended by Head Start children. The final number of schools involved in the follow-up study totalled 17 and the number of classes totalled 29.[2]

By the end of the study, there was an attrition of 24 subjects (Final totals: 117 HS; 111 NHS).

The working sample resulted in 146 males and 103 females. The sex breakdown for either Head Start attendees or children attending kindergarten is not known. This distribution certainly is heavily weighted on the male side.

The age range for HS subjects at the beginning of kindergarten was from 63 months to 70 months with a median of 67 months; for NHS children, the range was from 52 months to 84 months, with a median of 66 months. The bulk of the NHS fell within the HS range with only two children younger than 63 months and two children older than 70 months.

B. Comparability of Head Start and Non-Head Start Children

A question that is often raised in utilizing the control group methodology is the comparability of the control and experimental groups. Throughout the country it has been frequently suggested that the HS children may not be representative of children in poverty families. Whether this has been answered or not nationally, the need to demonstrate comparability in this type of research is essential. In this study, the comparability was investigated in the following ways:

1. comparison of total score on the original Caldwell Pre-School Inventory (measure of the child's functioning)
2. comparison of HS/NHS status and level of group IQ score of next oldest sibling in the same elementary school (representing the academic performance of family)

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[1] To balance the numbers of children in kindergarten classes, some children were selected from neighboring child development centers.

[2] In September, 1965, the entire sample was located in 25 kindergarten classrooms, 12 classes were being taught by teachers previously involved in Summer Head Start (HS_T) and 13 were taught by teachers not involved in Head Start (NHS_T). Seven children were continued in the follow-up study even though they had transferred to other schools. To accommodate these children the number of classes increased to 29.

3. comparison of NS/NHS status and the occupation of the main breadwinner in the family (representing level of vocational achievement)

4. comparison of HS/NHS status and participation or non-participation in the free milk program in the elementary schools (clear indication of poverty status)

Table I clearly indicates that there was no significant difference between the mean scores on the initial Pre-School Inventory given both HS and NHS children. It should be noted at this point that the Pre-School Inventory scores for the HS children were based on tests administered at the beginning of the Summer Program and the NHS children's tests were administered at the beginning of kindergarten.

Table II indicates that the other variables used to examine the comparability of the two groups also supports the thesis that both samples of children come from the same general supply of children in the poverty situation.

It is thus thought that any differences that are demonstrated in this study between the HS and NHS children would not be related to a bias in either the selection of the NHS control group or on the basis of considering parents or families who volunteered for the HS experience in Cleveland representing a different group than the usual poverty family having children in kindergarten.

III. Research Approach

A. Rating of concept attainment

The central theoretical interest of this follow-up study is the manner in which children demonstrate their attainment of concepts within the classroom (a natural setting as contrasted with a testing situation). Preliminary to the actual study there was a search for the classroom activity which would most readily stimulate behavior relevant to the target concept areas, viz., color, form-space, grouping, ordering, time sequence and time duration.

After an extensive review of the relevant literature and lengthy and detailed observation in Cleveland Public Schools kindergarten classrooms, a series of rating scales and a related manual were developed. (See Appendix A). It was determined that the best combination of classroom activities to acquire the widest range of rateable behavior were the free play and art situations. It was also determined that there would be a minimum of class disruption with the presence of one observer.

TABLE I

Comparison of the total score on Pre-school Inventory (PI)[a] for HS and NHS samples.

	N	Mean	S.D.
Head Start (HS)	76	151.33	35.79
Non-Head Start (NHS)	126	150.42	34.36

C.R. = .18 not significant

[a] Scores are based on the original PI manual developed by Dr. Bettye Caldwell deleting Item 3 (Draw-a-Person) and the personal care items. The total possible score was 241.

TABLE II

Head Start/Non-Head Start status related to Sibling Group IQ Score, Main Breadwinner's Occupation, and participation in Free Milk Program.

Variable	N	X^2	df	p
Sibling Group[a] IQ Score	79	.02	1	.90
Main Breadwinner's Occupation[b]	162	.35	1	.70
Participation in Free Milk Program[c]	182	1.25	1	.30

[a] Kuhlman-Anderson score of next oldest sibling in same elementary school.

[b] Skilled or non-skilled status of main breadwinner's occupation.

[c] Participation in free milk program indicates family is receiving welfare support.

A staff of eight observers was trained in the method of event sampling observation. Each observer was responsible for a minimum of 10 subjects and a maximum of 35. Although the HS/NHS status of the children could not be a guarded secret, awareness of such information was kept to a minimum. None of the report forms required such information. All charts indicating such status were kept by the research associate. All observers had various combinations of HS and NHS children.

The observer would spend an average of three hours per week for the approximately 10 to 12 children in each classroom. Some children were observed more frequently than others.[3] On three occasions during the kindergarten year (October, January and May) the observers interviewed the teachers to establish a teacher's rating. The same rating form and manual were used for the teacher judgments at the child's concept attainment.

The major concept areas were: color, form-space, grouping, ordering and time. Definitions for each area are presented in the manual (Appendix A). It will be noted that the time variable was divided into two sections, viz., time sequence and time duration.

The bases for inclusion of the selected concept areas are both theoretical and pragmatic. Suffice to say for this report, the concepts appear to have relevance to both the stages of concept development as viewed by cognitive theorists and the educational demands placed on youngsters in pre-school and elementary school situations. A more detailed explanation of this position will be attempted on some future occasion.

B. The division of research sample into extensive and intensive subjects.

It has become very evident to this researcher that cross-sectional measurements used in many pre-post type of follow-up studies have been at times insensitive to results of impact related to some type of stimulation or treatment. In this study, the attempt has been made to examine the steps in achieving certain concepts taken by a group of children as they have experienced kindergarten. There was the search to determine whether the HS children who have a pre-preparation for the kindergarten event would develop at a different rate or show a differing pattern of achievement than a like group of NHS children.

[3] The details of the intensive and extensive samples will be discussed in Section B, below.

Recognizing the budgetary limitations, it was necessary to restrict the number of subjects who were studied intensively to 50 (25 HS/25NHS) and carry on a more extensive examination of the enfolding process with a larger sample, i.e., 200 subjects (100 HS/100 NHS).[4] Whenever information was available, the total sample was used. Such utilization was true in the following instances:

1. comparisons of the pre- and post-test results.
2. determination of the comparability of the HS and NHS groups as far as biographical factors were concerned.
3. examination of the enfolding process in achieving levels of concept attainment by kindergarten children from poverty neighborhoods.

Intensive subjects were rated only by the observers on 15 different occasions. The rating periods included: 10/4 - 10/15; 10/18 - 10/25; 10/25 - 10/29; 11/1 - 11/5; 11/15 - 11/19; 11/29 - 12/3; 12/13 - 12/21; 1/10 - 1/21; 1/24 - 1/28; 2/7 - 2/18; 2/21 - 3/4; 3/21 - 3/25; 4/4 - 4/8; 4/25 - 4/29; and 5/16 - 5/25. Extensive subjects were rated by the teacher on three occasions (October, January and May) and by the observers on four occasions (November, December, February, March and April).

All available subjects were given a pre- and post-Caldwell Pre-School Inventory and the Peabody Picture Vocabulary Test. The HS subjects were pre-tested in July, 1965; the NHS group were pre-tested in September, 1965. The total sample was post-tested in June, 1966.

All biographical data,except for age of subject, was supplied anonymously by the Research Department of the Cleveland Public Schools. The biographical data was only utilized to determine comparability of HS and NHS groups.

C. The Teacher Variable

It has already been indicated under the discussion of the sample for this study that originally the HS and NHS children were distributed among 25 classrooms. Of the teachers instructing these classes, 13 were classified as NHS teachers and 12 were classified as HS teachers, depending on their participation in the summer HS program. Although there was an increase of classroom involvement to 29 kindergarten classes because of transfers to other schools, the teacher variable was investigated only on the basis of children who were in the original 25 classrooms. It was recognized that utilizing this characteristic of teacher may not be the most critical variable considering teacher effectiveness. However, two considerations led the investigator to select this variable, viz., 1) the project was conceived and developed with considerable dispatch and pressure, and we felt that in order to use more incisive variables much more time would have to be devoted to developing the idea in cooperation with the public school teachers and administration, and 2) there was the very real interest in the impact on the teacher of an intensive stimulation program such as Head Start.

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[4] By the end of the study, there were 23 HS and 22 NHS intensive subjects; 94 HS and 89 NHS extensive subjects.

D. Reliability of Instruments

Reliability for the basic instrument in this study was approached in two different ways:

1. inter-observer reliaility in which teacher and observer ratings were compared
2. inter-rater reliability

Table III which examines the inter-observer reliability reveals for the greater part a continuous movement towards higher correlation. These comparisons are in most instances based on data collected on two occasions, one month apart. Thus, considering the reported correlations, the suggested unreliability may not be as real, since we recognized the continuous developing of the children from month to month. For example, the following were the mean levels for the total group during January and February:

	January Ratings	February Ratings
Color	7	5
Form-Space	5	5
Grouping	5	5
Ordering	4	4
Time Sequence	4	3
Time Duration	1	1

The levels of correlation suggest a satisfactory amount of agreement even though many of the correlations are below the usually desirable level for inter-observer reliability. In addition to the time lapse between ratings, the lowered correlations might also be associated with the fact that the teacher's rating was based upon an estimate of performance during the entire month whereas the observer was using small samples of behavior at certain critical times during the month. The correlations for time duration are unusually high for the last two comparisons. It is likely that this results from the narrow range of the scale and the limited achievement of the children in time duration.

TABLE III

Inter-observer Reliability based on three comparisons
of Teacher and Observer Ratings.[a]
(Extensive Subjects)

Concept	Contiguous Rating Periods		
	Oct/Nov-Dec	Jan/Feb	May/April
Color	.50[b]	.58	.67
Form-Space	.54	.49	.68
Grouping	.38	.56	.55
Ordering	.31	.66	.54
Time Sequence	,33	.48	.45
Time Duration	.18	.73	.80
	N=198	N=191	N=183

[a] The teacher ratings were made during months of October, January, and May. The most contiguous observer rating was compared with each teacher rating. Therefore, the November/December, February and April observer ratings were used.

[b] Pearson product-moment correlations of .19 and larger are considered significant at less than the .01 level with samples of 175 to 200.

The inter-rater reliability procedure involved taking a sampling of 25 recordings made on intensive subjects. These protocols were rated by an independent rater using the six scales developed for the study. The inter-rater reliability correlation reached .87. This clearly suggests that the scales can be applied with considerable reliability by different individuals.

Concurrent validity for the measures of concept attainment was sought through inter-correlation with the parallel subtest scores of the Caldwell Preschool Inventory.[5] Table IV indicates the levels of correlation between the ratings carried out by the observers in April and by the teachers in May.

The significant correlations indicated under the May period strongly suggest that the types of ratings made by the teachers had a certain degree of similarity with the subscores the children received on the Preschool Inventory. Such a conclusion is somewhat less clearly established in view of the correlations using the ratings made in April. However, even the April ratings resulted in correlations for all areas but grouping, that were significant at the .01 level.

There appear to be satisfactory indications of reliability suggesting that this method of observation and rating of children's behavior through the concept attainment scales is achievable and accurate. There is also evidence that the concept areas, measured in different ways represent particular aspects of thinking. The trends that will be expressed as a result of this study seem to have sufficient backing from this examination of reliability and validity to warrant serious consideration.

IV. Results

A. Comparison of HS and NHS children during their kindergarten experience.

The following approaches were followed to investigate the impact of Summer Head Start:

1. Comparison of distribution of concept attainment ratings.
2. Examination of change score in concept attainment during kindergarten.
3. Examination of the profile of change as reflected in the median scores of both the intensive and extensive groups.

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[5] After a careful examination of the items of the Preschool Inventory it was possible to subgroup these into the five relative concept areas of the study. The correlations in Table IV are based on the subtest scores.

TABLE IV

Comparison of subtest scores of Preschool Inventory and Final Concept Area Ratings. (Extensive Subjects)

Concept	Rating Period	
	April	May
Color	.28[a]	.40
Form-Space	.31	.23
Grouping	.12	.49
Ordering	.48	.44
Time	.24	.34
	N=143	N=143

[a] With samples of 125 subjects, Pearson product-moment correlations of .17 are significant at .05 level and .23 are significant at .01 level.

4. Comparison of HS and NHS achievement on cross-sectional tests including total scores and sub-scores of the Preschool Inventory and the Peabody Picture Vocabulary test.

5. Examination of the primarily pure HS and NHS kindergarten classes.

1. Comparison of the distribution of concept attainment scores of both HS and NHS groups.

Tables V through X present the Chi Square analysis of the frequency distributions of each concept area at the seven points in time. This portion of the study involves just the extensive groups which began at the start of kindergarten with 100 in each group and as Table V indicates, by the time two months had passed two subjects were lost out of the NHS group. At the end of the study there were 94 children in the HS group and 89 children in the NHS group.

It is very evident from Table V that the HS youngsters were performing at a significantly higher level than the NHS youngsters in all concept areas except grouping. Even in this area, as indicated by the number of children who were at the mid-point or beyond on the grouping scale, the HS youngsters were also tending to do better than the NHS youngsters.

Table VI indicates the comparison between HS and NHS youngsters after four months. There were significant differences in the color, ordering, time sequence and time duration concepts. For example, looking at the time sequence level four which was median rating of the HS group, we find that 50% of these children were at least able to compare verbally their speed or slowness in carrying out some function with the pace of other children. They have at least been able to recognize that they have finished something faster than someone else. However, the median level of the NHS children reflected their ability to tell a story which involves a series of events. An interpretation of such a difference in level of performance would suggest that the HS child is more aware of the other children around him. There is the utilization of external reference, suggesting that they have been able to go more beyond themselves than the NHS child. The evidence reflects more overall success for the HS group at this point in time.

Table VII which examines the HS and NHS children's achievement after about five months of kindergarten again shows the HS children performing at higher level than the NHS children. There are significant differences in favor of the HS child in

TABLE V

Summary of Comparisons Between HS and NHS Children at Completion of 2 Months of Kindergarten. (T_1)

		Median Level			Number of children at midpoint of scale and beyond[b]	
Concept	p[a]	HS	NHS	Combined	HS	NHS
Color	.001	7[c]	5	6	68/99 (68%)	50/90 (55%)
Form Space	.02	4[c]	3	4	62/98 (63%)	38/90 (42%)
Grouping	.20	4	4	4	46/96 (47%)	35/90 (38%)
Ordering	.01	4[c]	2	3	30/92 (32%)	13/87 (14%)
Time Sequence	.01	4[c]	2	4	33/97 (34%)	16/89 (17%)
Time Duration	.05	1[c]	1	1	18/94 (19%)	5/85 (5%)
		N=100	N=98			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

TABLE VI

Summary of Comparisons Between HS and NHS Children at Completion of 4 Months of Kindergarten. (T_2)

		Median Level			Number of children at midpoint of scale and beyond[b]	
Concept	p[a]	HS	NHS	Combined	HS	NHS
Color	.02	7[c]	7	7	79/98 (80%)	57/83 (68%)
Form-Space	.50	5	4	4	75/98 (76%)	57/83 (68%)
Grouping	.20	5	5	5	53/97 (54%)	48/83 (57%)
Ordering	.001	4[c]	4	4	39/92 (42%)	20/80 (25%)
Time Sequence	.02	4[c]	3	4	44/97 (45%)	23/84 (27%)
Time Duration	.05	1[c]	1	1	28/81 (34%)	16/71 (22%)
		N=100	N=98			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

TABLE VII

Summary of Comparisons Between HS and NHS Children at Completion of 5 Months of Kindergarten. (T_3)

Concept	p[a]	Median Level			Number of children at midpoint of scale and beyond[b]	
		HS	NHS	Combined	HS	NHS
Color	.20	5	5	5	62/97 (63%)	51/90 (56%)
Form Space	.10	5	4	4	69/93 (74%)	52/88 (59%)
Grouping	.20	5	5	5	64/97 (65%)	50/92 (54%)
Ordering	.05	4[c]	2	4	28/85 (32%)	15/74 (20%)
Time Sequence	.01	3[c]	2	2	32/92 (34%)	11/91 (12%)
Time Duration	.02	1[c]	1	1	22/84 (26%)	11/78 (14%)
		N=98	N=95			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

TABLE VIII

Summary of Comparisons Between HS and NHS Children at Completion of 6 Months of Kindergarten. (T_4)

			Median Level		Number of children at midpoint of scale and beyond[b]	
Concept	p[a]	HS	NHS	Combined	HS	NHS
Color	.20	5	5	5	61/83 (73%)	62/83 (74%)
Form Space	.20	5	4	5	68/86 (79%)	57/83 (68%)
Grouping	.01	5[c]	5	5	66/87 (75%)	52/88 (59%)
Ordering	.50	4	4	4	27/74 (36%)	20/68 (29%)
Time Sequence	.30	3	2	3	26/89 (29%)	15/85 (17%)
Time Duration	.50	1	1	1	8/70 (11%)	8/70 (11%)
		N=97	N=94			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

TABLE IX

Summary of Comparisons Between HS and NHS Children at Completion of 7 Months of Kindergarten. (T_5)

Concept	p[a]	Median Level			Number of children at midpoint of scale and beyond[b]	
		HS	NHS	Combined	HS	NHS
Color	.30	7	6	7	76/85 (89%)	60/77 (77%)
Form Space	.20	5	5	5	81/88 (92%)	69/80 (86%)
Grouping	.05	5[c]	5	5	73/87 (83%)	67/83 (80%)
Ordering	.02	4[c]	4	4	35/71 (49%)	22/65 (33%)
Time Sequence	.30	3	3	3	28/87 (32%)	16/80 (20%)
Time Duration	.50	1	1	1	17/67 (25%)	15/71 (21%)
		N=96	N=90			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

TABLE X.

Summary of Comparisons Between HS and NHS Children at Completion of 8 Months of Kindergarten. (T_6)

Concept	p[a]	Median Level HS	Median Level NHS	Median Level Combined	Number of children at midpoint of scale and beyond[b] HS	Number of children at midpoint of scale and beyond[b] NHS
Color	.02	8[c]	7	7	75/77 (97%)	64/72 (88%)
Form Space	.001	5[c]	5	5	71/74 (95%)	63/72 (87%)
Grouping	.50	6	5[c]	6	66/78 (84%)	57/73 (78%)
Ordering	.02	5[c]	4[c]	4	33/59 (55%)	18/62 (29%)
Time Sequence	.20	4	4	4	34/71 (47%)	25/72 (34%)
Time Duration	.50	1	1	1	26/66 (39%)	18/60 (30%)
		N=96	N=90			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

ordering, time sequence, and time duration. Even though there is no significant difference between the HS and NHS child in Form-Space, the HS child still shows the median level indicating his ability to utilize space. They make drawings that show appropriate proportions and/or intentionally delimit space. The median level for the NHS child is representative of the child who is able to use whatever space is made available to him. He is able to make representations that will be recognized as bodies.

Table VIII shows a significant difference between the HS and NHS children in the area of grouping. At this six month point of evaluation, the HS group still shows more progress in all but two of the areas, viz., color and time duration.

In a closer examination of the distribution of scores in the color concept, there is a bimodal distribution of ratings for the group of HS children. One subgroup clusters around the ability to choose a variety of colors for their work and the other group seems to have reached an ability to choose realistic colors for drawing. The NHS child is still mainly functioning around the choice of a variety of colors.

Table IX summarizes the extensive subjects functioning about 7 months after the beginning of kindergarten. HS children are performing at a significantly higher level in the areas of grouping and ordering. Again, there is the consistent finding that for time duration the HS group tends to be ahead of the NHS group. Even though the range of differences appears to be less vivid, we find in the grouping area more than a quarter of the HS children at or beyond the point where they are able to match and sort things on the basis of similar function. Only about ten per cent of the NHS children have been able to achieve at that level. It is also interesting to note that examining the HS distribution in the color area, there is still a rather distinct bimodal quality seen at the six-month level.

Some rather interesting changes are reflected in the measurements at eight months in the Table X. Whereas significant differences in the color, form-space areas have dropped out of the picture after about four months, some significant differences in favor of the HS youngster clearly return. There is also a significant difference in the ordering concept. A very high percentage of all the children have reached the mid-point or beyond on the scales in color and form-space. Concepts requiring more organizational talent (ordering, time sequence, time duration) have been attained by 50% or less of the samples.

Although the HS still show the bimodal nature of the color concept distribution, more of the children appear to be reaching the end of the scale and the bimodality is not as clearcut.

On the final examination of the two distributions, Table XI indicates four significant differences in favor of the HS group, viz., color, form-space, grouping, and time duration. The bimodality of the color distribution is no longer present in the HS group and at this time about one-quarter of the HS group is able to achieve at the top level of the color scale (the ability to blend color, and describe colored objects). Only about 6% of the NHS group was able to achieve at this particular level. In the form-space area over 25% of the HS group achieved at the level of differentiating angulation between ninety degree and various other angles. About 6% of the NHS was able to achieve at this particular level. Finally, the majority of both groups were able to attain a high level of performance in both the color and form-space areas.

In the grouping area the median level of the HS group indicates the ability to define words in terms of characteristic or function, whereas the NHS's median indicated the ability to differentiate groups of objects or identify contrasting characteristics. This difference again suggests that the HS group is performing more successfully in the verbal area.

Even though there was no significant difference in the time sequence distributions, more than a third of the HS children are at least able to refer to a sequence of events and only 15% of the NHS children reached this level.

In time duration, over 25% of the HS group arrived at the point of verbalizations about the passage of periods of time. Less than 5% of the NHS group achieved this level.

Through this method of evaluating the level of performance of the HS and NHS children, there is every indication that at least a portion of the HS group achieved a higher level of functioning than was noted in the NHS sample. These differences may well be related to a group of about 25 or 30% of the HS children who appear to have retained a higher level of functioning throughout the kindergarten year. Possibly, these children were able to learn to achieve within the educational situation. They evidently learned ways of utilizing the educational situation and have become more verbal.

Both groups were achieving very successfully in the color and form-space areas by the end of kindergarten. These so-called tools of learning, i.e., approach to color and form, may be of a different nature than the more complex concept areas of grouping, ordering, time sequence and time duration.

2. Examination of individual change scores in concept areas during kindergarten.

The criteria used for indicating degree of change was as follows: a) positive change: at least a two point difference

TABLE XI

Summary of Comparisons Between HS and NHS Children Within Two Weeks of Completion of Kindergarten. (T_7)

		Median Level			Number of children at midpoint of scale and beyond[b]	
Concept	p[a]	HS	NHS	Combined	HS	NHS
Color	.001	8[c]	7	8	84/86 (97%)	77/83 (92%)
Form Space	.001	6[c]	5	5	81/85 (95%)	76/81 (93%)
Grouping	.001	8[c]	6	7	82/85 (96%)	73/83 (87%)
Ordering	.30	7	6	7	63/82 (76%)	51/81 (62%)
Time Sequence	.30	6	5	6	59/84 (70%)	47/82 (57%)
Time Duration	.05	2[c]	1	2	52/80 (65%)	37/78 (47%)
		N=94	N=89			

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences

[b] The first number is the number of midpoint and beyond occurrences and the second, the number of subjects for which sufficiently ratable data was available

[c] Indicates that distribution which represented higher scores

when comparing the initial ratings with the end ratings, b) no change: no difference or one point difference when comparing the series of ratings, c) negative change: at least two points decrease when comparing the series of ratings. Two individuals made the determination of direction of change and when there was disagreement, the raters and principal investigator reached a group decision on the individual change score.

Tables XII and XIII reveal that there were no significant differences in the degree of positive change between the HS and NHS samples. In the teachers' ratings (Table XII) signifance was approached in two areas. Except for time sequence in the teachers' ratings, whenever there was trend toward positive change, it favored the HS sample.

Table XIV compares the differences seen between the teacher and the observer in making the change score rating. This table clearly indicates that the teacher and the observer were viewing the progress of individual children in somewhat different ways. The observer ratings may be considered more objective since they are less ego involved as far as producing change is concerned. One of the limitations of the observer ratings is around the infrequency of observation as compared to the teacher. In examining the distributions in the X^2 tables presented in Table XIV, it is quite evident that the teacher's bias is in favor of positive change except for the area of ordering; the observer indicated more incidents of no change than positive or negative change.

This section examining impact suggests, as did Section 1, that when a trend was evident the HS child was making more positive strides than the NHS child. However, the change score approach afforded only minimal support for this conclusion.

3. Examination of the profile of change as reflected in the median scores of all subjects rated on different occasions during kindergarten.

Charts I through VI present the series of median scores of intensive subjects. In all instances, except for form-space and time duration, the HS child begins at a higher level than the NHS child. In the color area, as represented in Chart I, the HS child is able to choose a variety of colors for his work at the outset, whereas the NHS child is only able to match colors used by another person. There is a very similar amount of variability throughout the kindergarten year shown by both groups. However, during the last month the HS child takes a significant jump ahead, reaching a point of being able to name colors of objects on request.

In the form-space area, there is an interesting variation which may be related to vacation periods. The HS youngster, after

TABLE XII

Comparison of Individual Change scores in Concept Areas for HS and NHS subjects as Indicated by a series of teacher ratings.

Concept	X^2	df	p
Color	1.02	1	.50
Form-Space	.25	1	.70
Grouping	3.32	1	.10[a]
Ordering	2.29	2	.50
Time Sequence	3.61	2	.20[b]
Time Duration	.17	1	.70

[a] More positive change indicated for HS group.

[b] More positive change indicated for NHS group.

TABLE XIII

Comparison of Individual change scores in Concept Areas for HS and NHS subjects as indicated by observer ratings.

Concept	X^2	df	p
Color	2.61	2	.30
Form-Space	.86	2	.70
Grouping	1.08	2	.70
Ordering	.63	2	.80
Time Sequence	2.16	2	.50
Time Duration	.14	1	.80

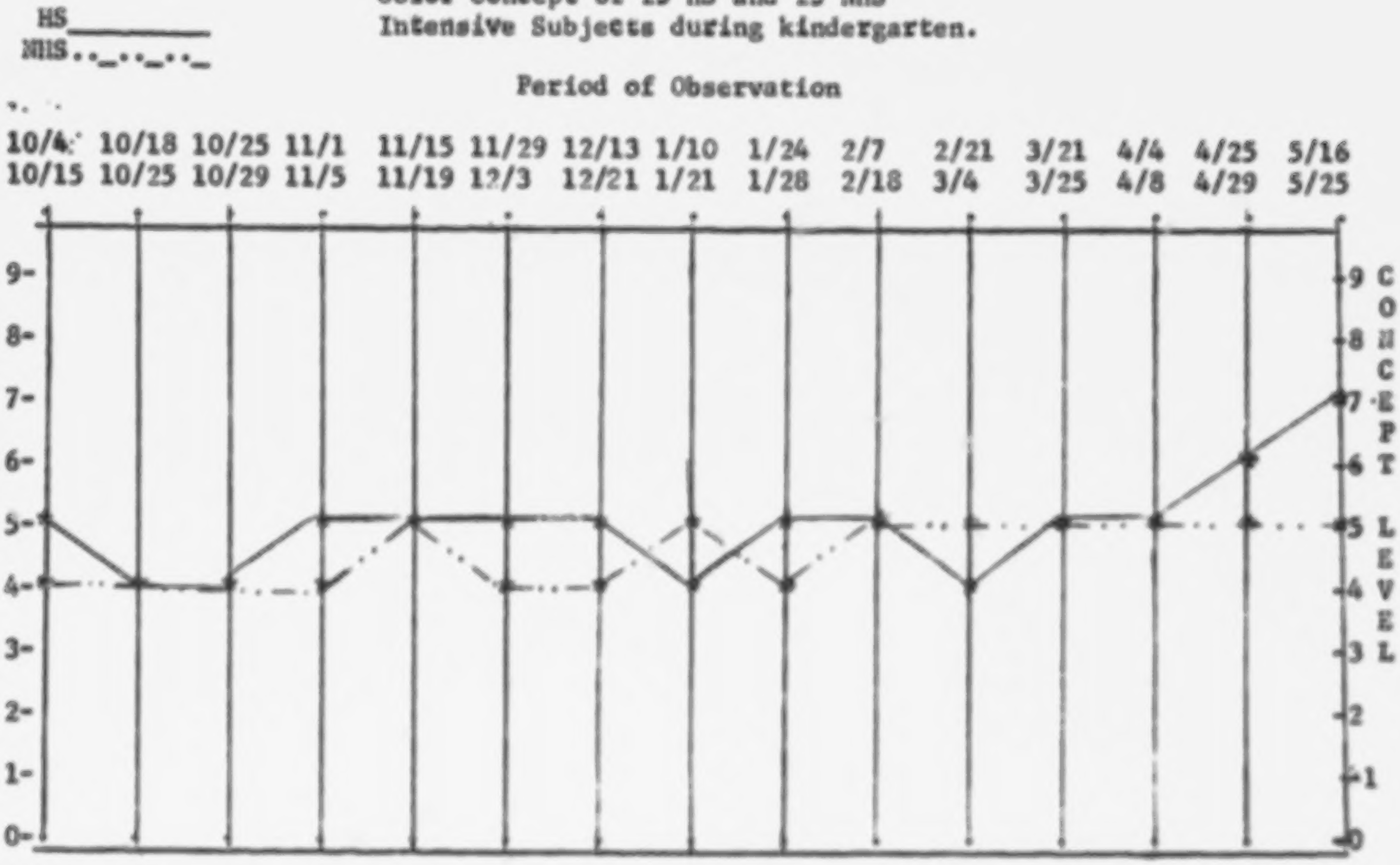
TABLE XIV

Comparison of Teacher and Observer Ratings of Individual change scores in Concept areas

Concept	χ^2	df	p
Color	8.92	2	.02
Form-Space	17.03	2	.001
Grouping	28.31	2	.001
Ordering	14.83	2	.001
Time Sequence	9.87	2	.01
Time Duration	4.76	1	.05

CHART I

Pattern of Median Scores in Attainment of Color Concept of 25 HS and 25 NHS Intensive Subjects during kindergarten.

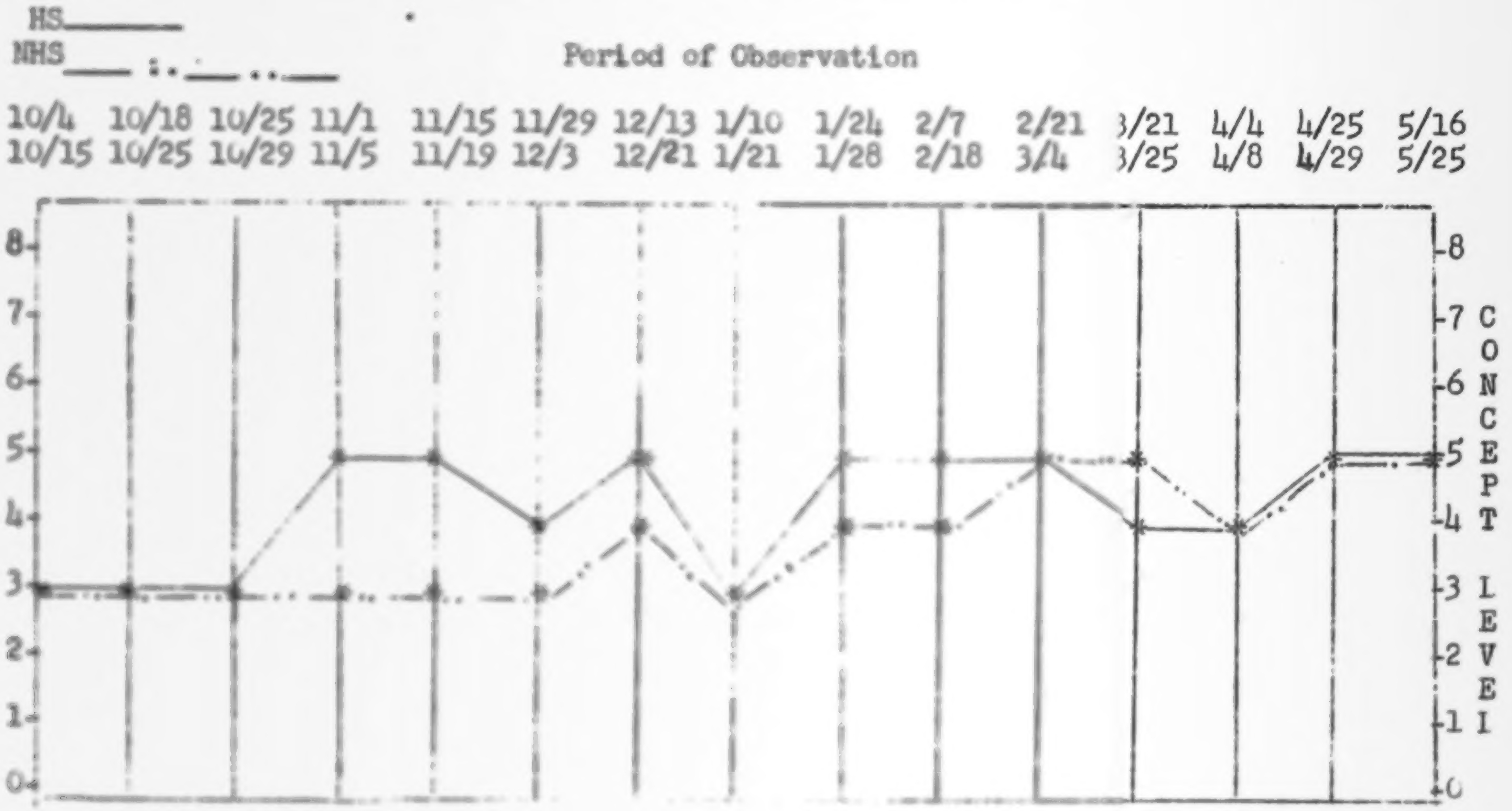


HS	19	19	17	20	11	16	16	19	14	18	16	15	20	14	21
NHS	19	16	16	18	13	12	13	19	17	12	16	15	19	19	19
aRated	30	35	33	36	24	28	29	36	31	30	34	30	32	33	30
Total Available	50	49	48	48	46	46	46	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART II

Pattern of Median Scores in Attainment of Form-Space Concept of 25 HS and 25 NHS Intensive subjects during kindergarten.

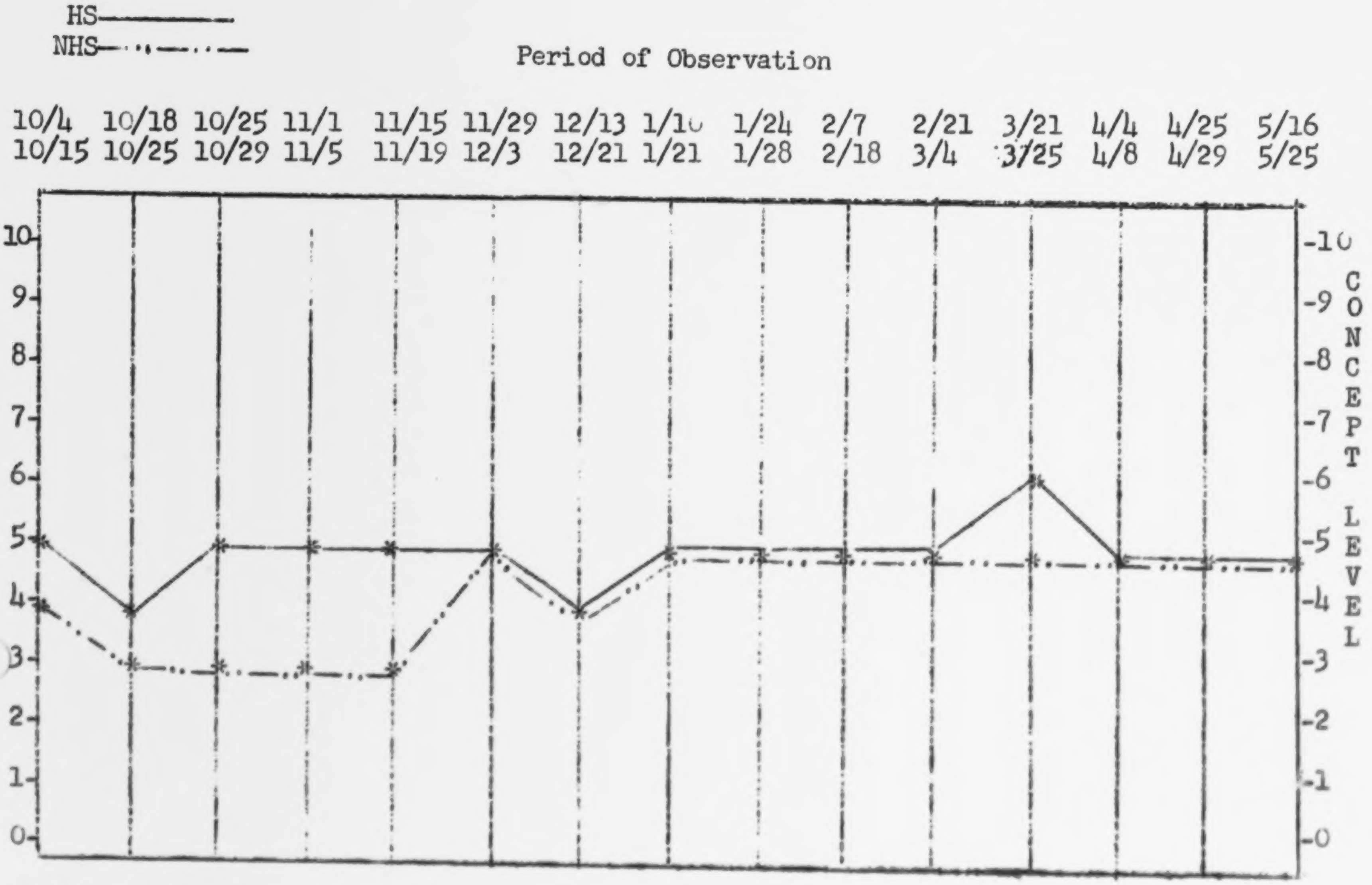


	10/4 10/15	10/18 10/25	10/25 10/29	11/1 11/5	11/15 11/19	11/29 12/3	12/13 12/21	1/10 1/21	1/24 1/28	2/7 2/18	2/21 3/4	3/21 3/25	4/4 4/8	4/25 4/29	5/16 5/25
HS	19	19	19	16	16	17	16	15	14	17	20	17	22	14	18
NHS	16	15	17	17	12	16	14	15	14	13	11	18	18	18	17
Rated[a]	35	34	36	31	28	33	30	30	28	30	31	35	40	32	35
Total Available	50	42	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART III

Pattern of Median Scores in Attainment of Grouping Concept of 25 HS and 25 NHS Intensive subjects during kindergarten.

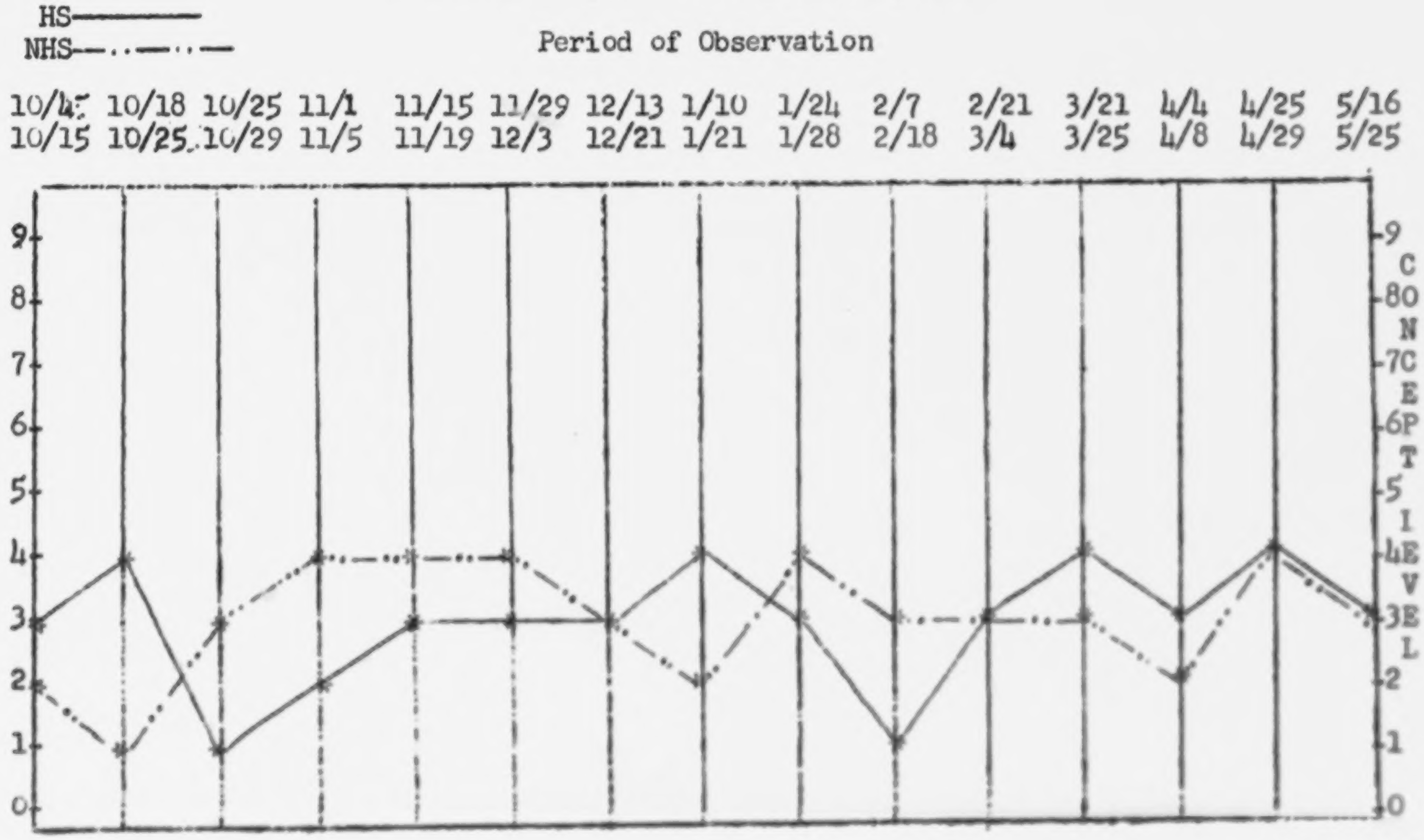


HS	24	21	19	23	14	20	18	21	14	18	15	19	22	15	22
NHS	24	20	17	19	18	20	17	20	19	19	20	19	20	12	22
Rated[a]	48	41	36	42	32	40	35	41	33	37	35	38	42	27	44
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART IV

Pattern of Median Scores in Attainment of Ordering Concept of 25 HS and 25 NHS Intensive subjects during kindergarten.

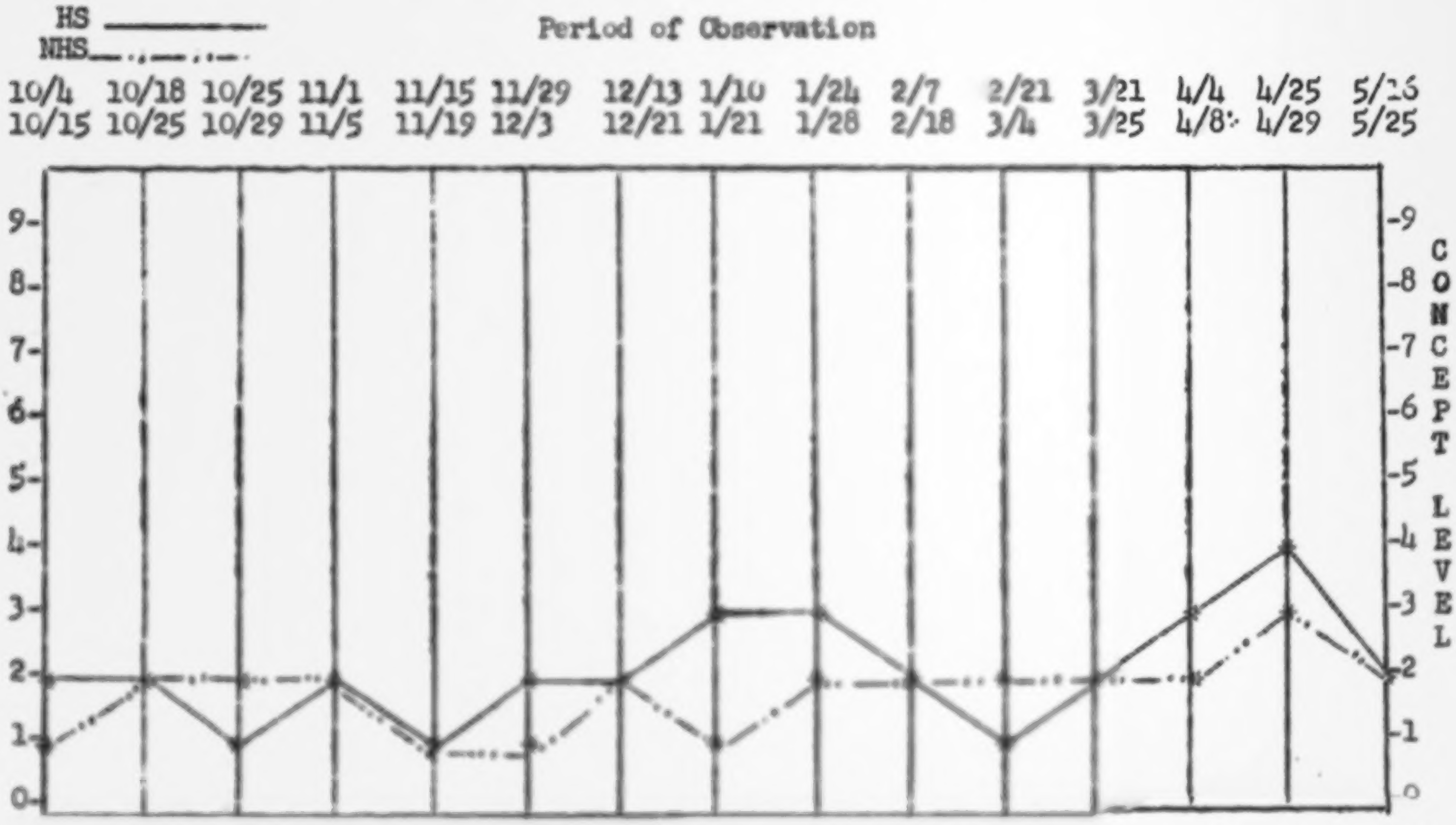


	10/4 10/15	10/18 10/25	10/25 10/29	11/1 11/5	11/15 11/19	11/29 12/3	12/13 12/21	1/10 1/21	1/24 1/28	2/7 2/18	2/21 3/4	3/21 3/25	4/4 4/8	4/25 4/29	5/16 5/25
HS	18	12	19	19	17	18	20	19	20	14	20	18	18	21	18
NHS	11	19	18	10	12	15	16	16	15	18	15	14	15	17	16
Rated[a]	29	31	37	29	29	33	36	35	35	32	35	32	33	38	34
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART V

Pattern of Median Scores in Attainment of Time Sequence Concept of 25 HS and 25 NHS Intensive subjects during kindergarten.

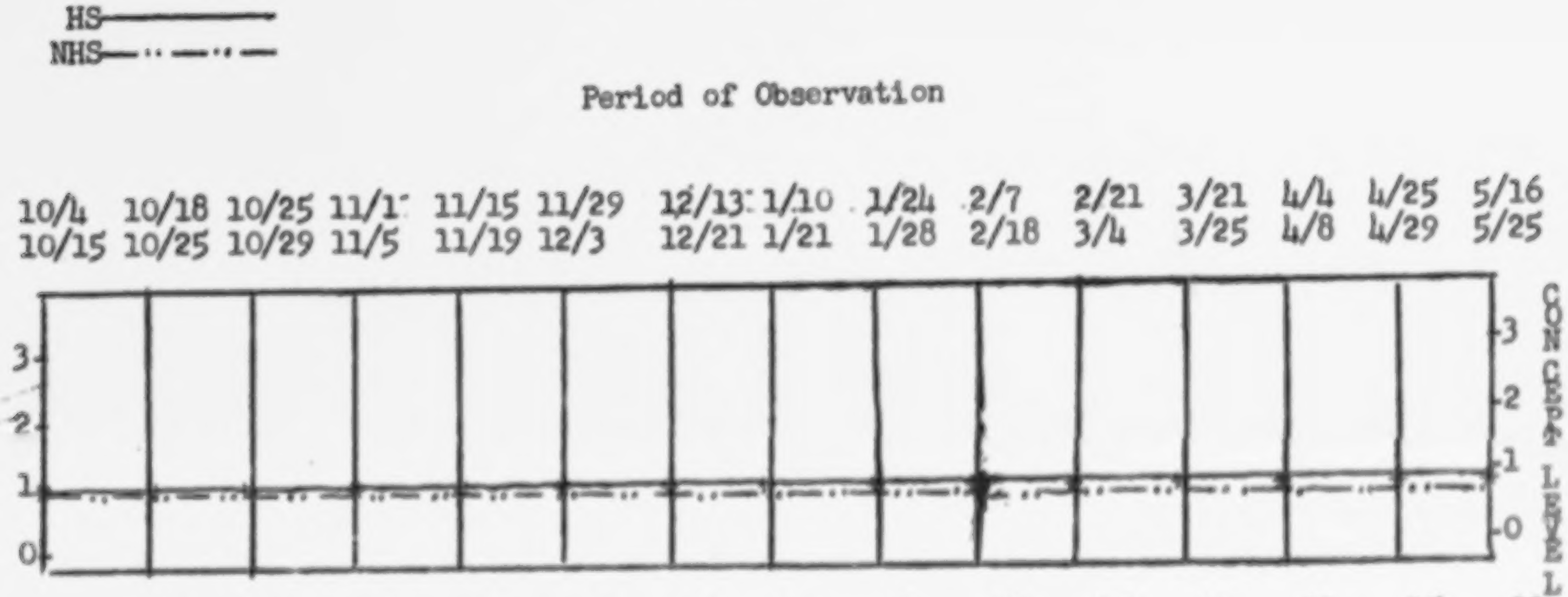


HS	22	17	18	22	19	14	16	21	13	15	18	20	21	16	20
NHS	19	17	14	18	13	16	14	20	17	17	16	18	17	10	20
Rated[a]	31	34	32	40	32	30	30	41	30	32	34	38	38	26	40
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART VI

Pattern of Median Scores in Attainment of Time Duration Concept of 25 HS and 25 NHS Intensive Subjects during kindergarten.



HS	24	21	19	23	14	20	18	21	14	18	15	19	22	15	22
NHS	24	20	17	19	18	20	17	20	19	19	20	19	20	12	22
Rated[a]	48	41	36	42	32	40	35	41	33	37	35	38	42	27	44
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

initial functioning around the same level as the NHS youngster, moves ahead very significantly during the month of November. After the winter recess, the HS child drops back to his original level, as does the NHS youngster. There is a quick return to the pre-winter recess level and these gains are maintained until the measurement after the spring recess. Both groups end up at the same level (5) by the end of kindergarten. The impact of recess from school suggests that progress in the form-space area seems to require considerable reinforcement. These findings lend support to the belief that form-space development is highly related to structural development, as such form-space activity requires extra and continuous reinforcement in order to move beyond the constitutionally established level of functioning. The extra preparation of the HS child seems to have so increased his school set that he can spurt ahead but, with extended absence from school, he will quickly return to his basic level of development.

In the grouping area, the HS child is able to start the kindergarten situation with the ability to do logical grouping in context, whereas the NHS child is able to pair a linguistic symbol with a related object or event. After slight regression by the HS child, there is a return to level (5) and a continuation at this point until about March when the median level moves to (6) (ability to differentiate groups of objects or events by contrasting characteristics) and then there is a return to the original level (5) at the end of the kindergarten year. The NHS child has shown a similar regression initially, and then is able to return to his original level about mid-year, and finally levels off at (5) and continues at this level for the rest of the year. The March spurt may be an indication of the beginning of a further step in development by the HS child. This particular pattern supports the thesis that spurts of growth in concept attainment are followed by regressions to a previous level, before the occurrence of consolidation at the higher level.

Chart IV represents the development of the ordering concept. This chart shows a considerable amount of fluctuation for both HS and NHS groups. Although both groups end up at the same level (3) , the HS group has shown considerably more variation during the entire year. The HS child seems to be more actively grappling with the problems of thinking involved in the ordering area. This type of engagement may suggest a greater sensitivity to the demands that the kindergarten teacher places upon him. Chart V on time sequence seems to offer similar evidence. Again, the HS group is responding to events requiring the organization of stimuli with more sophistication than the NHS group. Such a conclusion emerges from the very evident spurt by the HS group prior to the end of kindergarten, viz., comfortable use of time words.

In the time duration development (Chart VI) both groups achieved the ability to make some attitudinal adjustment to meet time demands. This level is a minimal attainment in this area.

In summary, HS group's median scores in each concept area are at least as high as the NHS group's at the final rating period. In the area of color concept the HS children seemed farther along. The spurt shown by the HS child in grouping and time sequence attainment just prior to the end of kindergarten would suggest a probable upswing in the near future. The variability shown throughout the year in ordering concept achievement on the part of the HS child as contrasted with the NHS child may reflect an increased awareness to the school demands.

There is little doubt that the Headstart group was developing in a different way during the kindergarten year. The degree of variation may be viewed positively if one accepts the position that spurts and regressions precede consolidation.

4. Comparison of HS and NHS subject's achievement based on cross-sectional testing.

The first determination based on pre- and post-test scores is described in Table XV. As indicated earlier, the Pre-school Inventory was administered to the HS children at the beginning of July, 1965, and the initial testing for the NHS children was in September of 1965. The final testing for both groups was in June, 1966. It is very evident that both the HS group and the NHS group made highly significant gains as reflected in the pre- and post-scores of the Pre-school Inventory. The difference between the mean gains of HS and NHS as shown in this table indicates a somewhat higher gain for the HS group. The difference is significant at the .10 probability level. Once again, we find trend in the direction of the HS group as far as over-all accomplishment is concerned. It should be pointed out that the HS group began the kindergarten year with a mean score of 168 on the Pre-school Inventory. Further, we must recognize that there are only approximately three points' difference in the final mean score of the HS and NHS groups. As far as group means are concerned, the NHS group seems to have almost caught up to the HS group by the end of kindergarten.

Table XVI examines the children's achievement on the Pre-school Inventory based on sub-section scores. The sub-sections were established in keeping with the definitions of the five major variables of this study by inspecting and categorising the items.

There is a very similar pattern in the tests of the difference between means for the HS group, NHS group and the total sample. However, one of the t tests, i.e., grouping in the HS sample, shows a significant difference at the .01 level. This is particularly interesting since the difference between the means for the

TABLE XV

Comparison of Change in the total pre and post scores on the Preschool Inventory (PI) for HS and NHS samples

Time of Testing	HS Sample					NHS Sample				
	Mean	M_D	S_D	t	p	Mean	M_D	S_D	t	p
PI_1	151.01[a]									
PI_2		42.79	24.87	15.23	7,0005	157.85	35.07	24.25	15.27	7,0005
PI_3	190.19					187.23				
		N = 56					N = 87			

t test of Difference
between HS and NHS

t = 1.39

p .10

[a] It should be noted that the HS group had a mean PI score of 168.17 at the end of the summer Headstart program. The difference between the July testing and the end of August testing is significant at the .001 level.

TABLE XVI

Comparison of Change in subtest scores[a] on the pre and post Preschool Inventory for HS and NHS samples.

	HS			NHS			Total Sample		
Subtest	Mean Difference	t	p	Mean Difference	t	p	Mean Difference	t	p
Color	7.75	.939	NS	8.07	1.07	NS	8.21	1.12	NS
Form-Space	9.57	1.37	NS	9.36	1.24	NS	9.58	1.29	NS
Grouping	27.43	3.05	.01	31.51	1.65	NS	30.69	.71	NS
Ordering	10.27	1.38	NS	9.54	1.22	NS	10.11	1.31	NS
Time	5.08	.43	NS	2.73	.64	NS	4.06	.45	NS
	$N_{Pre} = 56$:$N_{Post}=94$			$N_{Pre} = 87$:$N_{Post}=89$			$N_{Pre} = 143$:$N_{Post}=183$		

[a] The items of the Preschool Inventory were categorized in the following way:

Color - 92-99, 100-105
Form - 56-59, 143
Grouping - 1, 2, 4, 7, 8, 9, 10, 11-20
21-30, 31-35, 37, 38, 50, 51,
52-55, 60-66, 79-90, 91, 106-110,
118, 119-123, 135-142, 144-148
Ordering - 36, 39-42, 43-47, 48-49, 67-78,
124-134
Time - 5, 111-117

HS sample in grouping is 27.43 and the same difference for the NHS sample is 31.51. The t test reaches a significant level for the HS sample since the standard deviation for the post-test distribution is 27.52 while in the NHS, the standard deviation for the post-test distribution is 54.95. The NHS subjects showed much more variability in development during the kindergarten year, at least in the grouping area.

Tables XVII and XVIII are further examinations of test scores to determine whether the HS and NHS groups are showing differences at the end of kindergarten. The examination of the pre- and post-Peabody Picture Vocabulary test and the Lee-Clark Readiness test (administered by Cleveland Public Schools) indicate that there are no significant differences in achievement between the HS and NHS children.

The substance of this particular examination of difference indicates that the HS and NHS children were functioning, on the average, about the same at the end of kindergarten as measured by cross-sectional tests. It should be noted that difference tests, which are based on initial tests of HS children (administered July, 1965) reveal that the HS youngster shows a greater amount of change than the NHS child who was tested in September of the same year. This would suggest that the accelerated pace that was initiated during the summer was not maintained at the same level during the kindergarten year. It should be noted that both groups showed considerable change as reflected by the Pre-school Inventory.

5. Examination of the primarily HS kindergarten class and the primarily NHS kindergarten class.

Circumstances in the Cleveland Public Schools resulted in two classes being primarily HS and two classes primarily NHS of the 25 kindergarten classes involved in this study. Approximately 80% or more of the children in these particular kindergarten classes were either HS or NHS children. A comparison was made of some final measurements.

Table XIX indicates that there are no differences approaching an acceptable significance level in the achievement of the two sets of children. The results of the two X^2 tests (the final teachers' ratings on ordering concept and the final total score on the Pre-school Inventory) indicated the trend toward higher achievement of the HS children. Again, these results just show a slight trend.

B. ← B. The relationship between concept attainment of children and HS or NHS teachers in the kindergarten classroom.

This portion of the study was to determine whether children may show different kinds of responses in concept attainment relevant to the teacher's experience with the Summer HS program.

TABLE XVII

Comparison of Headstart (HS) and Non-Headstart (NHS) on final scores and amount of change in Pre and Post Peabody Picture Vocabulary Test (PPVT)

	Final Score		Amount of Change				
	N	Mean	N	$Mean_D$	SD_D	t	p
HS	94	47.78	28	10.75	3.42	.87	NS
NHS	85	47.84	83	13.06	5.24		

TABLE XVIII

Comparison of Headstart and Non-Headstart on Lee - Clark Reading Readiness Test administered at the end of Kindergarten.

Test Score Range (Raw Scores)	Headstart	Non-Headstart
40 - 64	86 (85%)	69 (81%)
0 - 39	15 (15%)	11 (19%)
	101	80

N = 181

$\chi^2 = .04$

NS

TABLE XLX

Comparison of two kindergartens primarily composed of Headstart children and two kindergartens composed primarily of Non-Headstart children.

Variable	N	df	X^2	p
PI (final score)	38	1	.96	NS
PPVT (final score)	38	1	.12	NS
C (Observer)	29	1	.87	NS
C (Teacher)	29	1	.32	NS
F - S (Observer)	25	1	.00	NS
F - S (Teacher)	27	1	.00	NS
G (Observer)	27	1	.00	NS
G (Teacher)	28	1	.00	NS
O (Observer)	27	1	.36	NS
O (Teacher)	28	1	1.29	.30
TS (Observer)	28	1	.00	NS
TS (Teacher)	28	1	.00	NS

It has already been pointed out that we were only using the original 25 classrooms to which the children were assigned at the time of kindergarten. (12 were taught by HS teachers and 13 by NHS teachers).

Table XX, which examines the comparison of the overall functioning of the children in the HS teacher classes with the children in the NHS teacher classes, strongly suggests the lack of relevance of the teacher's exposure to HS program in determining the children's achievement in concept attainment. There is one significant difference in time duration after eight months in kindergarten, but this is viewed as more of a chance phenomenon, rather than representing a real difference.

To examine special interactions between student and teacher, the investigator subdivided the HS and NHS children within each teacher subgrouping. Table XXI presents a comparison of HS and NHS children within the HS teachers' classes. As might be expected from the previous discussion (Section A), when there were significant differences, they were in favor of the HS children. However, for the first six months the HS children were most clearly ahead in the time concept area. In the latter portion of the kindergarten year the level of significance dropped out for time sequence. It was replaced by significantly higher functioning in the ordering concept. In the final rating, the HS children were rated higher by the formerly HS teachers in grouping, ordering, and time duration.

Table XXII examines the situation in the NHS teacher classrooms. Again the HS children showed higher level of performance, whenever there was a significant difference between HS and NHS. It was interesting to note that the concept areas where the HS children were performing better showed a different pattern than the one described in the HS teacher classrooms. The concept areas that most often produced significant differences were color and form-space. Another area tended to be grouping. Significant differences in time and ordering occurred only once for each area. In the final rating the NHS teacher rated the HS children significantly higher in only one area, viz., form-space. This aspect of the analysis suggests differences in type of achievement dependent on kind of teacher. The HS child was evidently functioning better than his NHS counterpart in response to the emphasis of the teacher. The NHS teacher seemed to evoke color and form-space advancement; the HS teacher seemed to produce accelerated progress in the time sequence or ordering areas.

C. The relationship between the sex variable and concept attainment.

This discussion examines the pattern of concept attainment of poverty youngsters considering the sex variable. Charts VII through XII suggest that girls tend to be faster than boys in concept attainment. This conclusion is most vividly demonstrated in Chart VII which discusses the development of the color concept. The girl begins higher and although there

TABLE XX

Comparison of Concept Attainment of all extensive subjects in HS_T and NHS_T kindergartens.

	Concept	Median Level			Midpoint and Beyond[b]		
		p[a]	HS_T	NHS_T		HS_T	NHS_T
2 mos	Color	.20	6	7	(4)	88/100	79/88
	Form-Space	.20	3	4	(4)	48/100	58/97
	Grouping	.50	4	5	(5)	36/97	50/96
	Ordering	.20	3	3	(4)	40/92	46/93
	Time Sequence	.95	2	3	(4)	37/99	44/95
	Time Duration	.70	1	1	(2)	11/92	16/95
4 mos	Color	.90	7	7	(4)	93/101	80/89
	Form-Space	.30	5	5	(4)	77/101	63/89
	Grouping	.95	4	4	(5)	38/101	34/88
	Ordering	.10	4	4	(4)	60/92	62/89
	Time Sequence	.20	3	4	(4)	47/102	53/88
	Time Duration	.10	1	1	(2)	23/77	25/84
5 mos	Color	.30	5	6	(4)	87/104	83/92
	Form-Space	.70	6	5	(4)	69/102	60/87
	Grouping	.20	5	5	(5)	66/105	57/93
	Ordering	.30	4	4	(4)	51/83	47/84
	Time Sequence	.50	2	2	(4)	42/102	32/90
	Time Duration	.20	1	1	(2)	19/83	19/77
[illegible] mos	Color	.30	5	5	(4)	79/93	67/78
	Form-Space	.70	5	4	(4)	65/90	64/86
	Grouping	.10	5	5	(5)	67/104	56/86
	Ordering	.10	4	4	(4)	40/75	55/74
	Time Sequence	.70	3	3	(4)	45/97	33/84
	Time Duration	.90	1	1	(2)	9/104	9/103
7 mos	Color	.70	7	7	(4)	80/86	67/76
	Form-Space	.10	5	5	(4)	81/91	69/77
	Grouping	.98	5	5	(5)	75/90	65/80
	Ordering	.50	4	4	(4)	50/70	53/66
	Time Sequence	.50	3	3	(4)	40/90	31/77
	Time Duration	.50	1	1	(2)	15/72	17/66

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

(continued)

TABLE XX
(continued)

Comparison of Concept Attainment of all extensive subjects in MS_T and NMS_T kindergartens.

	Concept	Median Level			Midpoint and Beyond[b]		
		p^a	MS_T	NMS_T		MS_T	NMS_T
8 mos	Color	.10	8	7	(4)	71/71	75/78
	Form-Space	.30	5	5	(4)	63/67	71/79
	Grouping	.10	6	6	(5)	64/73	59/78
	Ordering	.80	4	4	(4)	47/61	45/60
	Time Sequence	.30	4	4	(4)	51/70	44/83
	Time Duration	.01	1[c]	1	(2)	27/59	17/67
9 mos	Color	.50	8	8	(4)	87/88	78/81
	Form-Space	.70	5	5	(4)	79/85	78/81
	Grouping	.50	7	8	(5)	82/88	73/80
	Ordering	.90	7	7	(4)	78/83	74/80
	Time Sequence	.50	6	5	(4)	69/87	63/79
	Time Duration	.20	2	2	(2)	43/85	46/73

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

[c] Indicates that distribution which represented higher attainment in concept area.

TABLE XXI

Summary of comparisons of concept attainment of Headstart (HS) and Non-Headstart (NHS) children in HS teacher classrooms during kindergarten.

	Concept	Median Level			Midpoint and Beyond[b]		
		p[a]	HS	NHS		HS	NHS
2 mos	Color	.30	6	5	(4)	53/59	34/40
	Form-Space	.50	4	3	(4)	31/59	16/40
	Grouping	.70	4	3	(5)	23/56	12/40
	Ordering	.20	4	2	(4)	28/53	12/38
	Time Sequence	.02	3[c]	2	(4)	27/58	10/40
	Time Duration	.50	1	1	(2)	10/56	1/35
4 mos	Color	.50	7	7	(4)	54/59	38/41
	Form-Space	.90	5	5	(4)	46/59	30/41
	Grouping	.50	5	5	(5)	39/59	25/41
	Ordering	.20	4	4	(4)	38/53	21/38
	Time Sequence	.001	4[c]	2	(4)	31/59	15/42
	Time Duration	.05	1[c]	1	(2)	17/45	5/31
5 mos	Color	.20	5	5	(4)	52/59	34/44
	Form-Space	.30	5	4	(4)	40/57	28/44
	Grouping	.80	5	5	(5)	40/60	26/44
	Ordering	.30	4	3	(4)	34/50	16/32
	Time Sequence	.05	3[c]	2	(4)	27/57	15/44
	Time Duration	.20	1	1	(2)	13/50	6/32
6 mos	Color	.90	5	5	(4)	43/51	35/41
	Form-Space	.50	5	5	(4)	39/51	25/38
	Grouping	.30	5	5	(5)	41/53	26/42
	Ordering	.05	4[c]	2	(4)	27/44	12/30
	Time Sequence	.10	4	2	(4)	28/55	17/41
	Time Duration	NS	1	1	(2)	6/40	3/30
7 mos	Color	.50	7	7	(4)	46/49	34/37
	Form-Space	.05	5	5[c]	(4)	47/52	34/39
	Grouping	.80	5[c]	5	(5)	42/51	33/39
	Ordering	.001	4	4	(4)	35/41	15/29
	Time Sequence	.20	3	3	(4)	25/52	15/38
	Time Duration	.50	1	1	(2)	9/38	6/34

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

[c] Indicates that distribution which represented higher attainment in concept area.

(continued)

TABLE XXI
(continued)

Summary of comparisons of concept attainment of
Headstart (HS) and Non-Headstart (NHS) children
in HS teacher classrooms during kindergarten.

	Concept	Median Level			Midpoint and Beyond[b]		
		p[a]	HS	NHS		HS	NHS
8 mos	Color	.30	8	7	(4)	41/41	30/30
	Form-Space	.80	5	5	(4)	38/38	25/29
	Grouping	.30	6	5	(5)	36/41	28/32
	Ordering	.02	5[c]	4	(4)	29/33	18/28
	Time Sequence	.20	5	4	(4)	31/39	20/31
	Time Duration	.50	1	1	(2)	16/34	11/25
9 mos	Color	.50	8	8	(4)	50/51	37/37
	Form-Space	.10	6	5	(4)	47/50	32/35
	Grouping	.05	8[c]	6	(5)	49/51	33/37
	Ordering	.01	7[c]	6	(4)	45/48	33/35
	Time Sequence	.10	6	5	(4)	42/50	27/37
	Time Duration	.05	2[c]	1	(2)	30/49	13/36

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

[c] Indicates that distribution which represented higher attainment in concept area.

TABLE XXII

Summary of comparisons of concept attainment of
Headstart (HS) and Non-Headstart (NHS) children
in NHS teacher classrooms during kindergarten.

	Concept	Median Level			Midpoint and Beyond[b]		
		p[a]	HS	NHS		HS	NHS
2 mos	Color	.10	7	6	(4)	35/39	43/48
	Form-Space	.01	5^c	3	(4)	30/38	22/48
	Grouping	.20	5	3	(5)	22/39	22/48
	Ordering	.10	4	2	(4)	23/38	16/47
	Time Sequence	.20	4	2	(4)	22/38	18/47
	Time Duration	.50	1	1	(2)	8/37	4/48
4 mos	Color	.01	8^c	7	(4)	35/38	35/40
	Form-Space	.20	5	4	(4)	28/38	27/40
	Grouping	.10	6	5	(5)	24/37	22/40
	Ordering	.10	5	4	(4)	31/38	23/40
	Time Sequence	.70	5	4	(4)	25/37	25/40
	Time Duration	.30	1	1	(2)	11/35	10/38
5 mos	Color	.10	7	5	(4)	34/37	39/44
	Form-Space	.20	5	4	(4)	28/35	24/42
	Grouping	.10	4	4	(5)	23/36	23/46
	Ordering	.50	4	3	(4)	21/34	17/40
	Time Sequence	.01	3^c	2	(4)	17/35	9/45
	Time Duration	.20	1	1	(2)	9/33	5/44
6 mos	Color	.50	7	5	(4)	27/31	36/40
	Form-Space	.02	5^c	4	(4)	28/34	31/43
	Grouping	.05	6^c	5	(5)	25/33	25/44
	Ordering	.50	4	4	(4)	24/29	24/36
	Time Sequence	.70	3	2	(4)	16/33	13/42
	Time Duration	NS	1	1	(2)	2/29	6/38
7 mos	Color	.02	7^c	5	(4)	33/36	34/40
	Form-Space	.02	5^c	5	(4)	34/36	35/41
	Grouping	.05	6^c	5	(5)	31/36	34/44
	Ordering	.20	6	4	(4)	26/30	25/34
	Time Sequence	.70	3	3	(4)	15/35	16/42
	Time Duration	.30	1	1	(2)	8/29	9/37

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

[c] Indicates that distribution which represented higher attainment in concept area.

(continued)

TABLE XXII
(continued)

Summary of comparisons of concept attainment of Headstart (HS) and Non-Headstart (NHS) children in NHS teacher classrooms during kindergarten.

	Concept	Median Level			Midpoint and Beyond		
		p[a]	HS	NHS		HS	NHS
8 mos	Color	.02	7[c]	6	(4)	35/36	40/42
	Form-Space	.001	5[c]	5	(4)	33/36	38/43
	Grouping	.50	6	6	(5)	30/37	29/41
	Ordering	.05	7[c]	4	(4)	20/26	25/34
	Time Sequence	.30	4	4	(4)	21/32	23/41
	Time Duration	.20	1	1	(2)	10/32	7/35
9 mos	Color	.20	8	7	(4)	34/35	44/46
	Form-Space	.001	6[c]	5	(4)	34/35	44/46
	Grouping	.10	8	6	(5)	33/34	40/46
	Ordering	.20	7	5	(4)	32/34	42/46
	Time Sequence	.30	6	5	(4)	27/34	36/45
	Time Duration	.30	2	2	(2)	22/31	24/42

[a] A X^2 analysis was used to compare the frequency distributions of level occurrences in each concept area.

[b] The first number is the number of occurrences and the second is the total N rated on that scale.

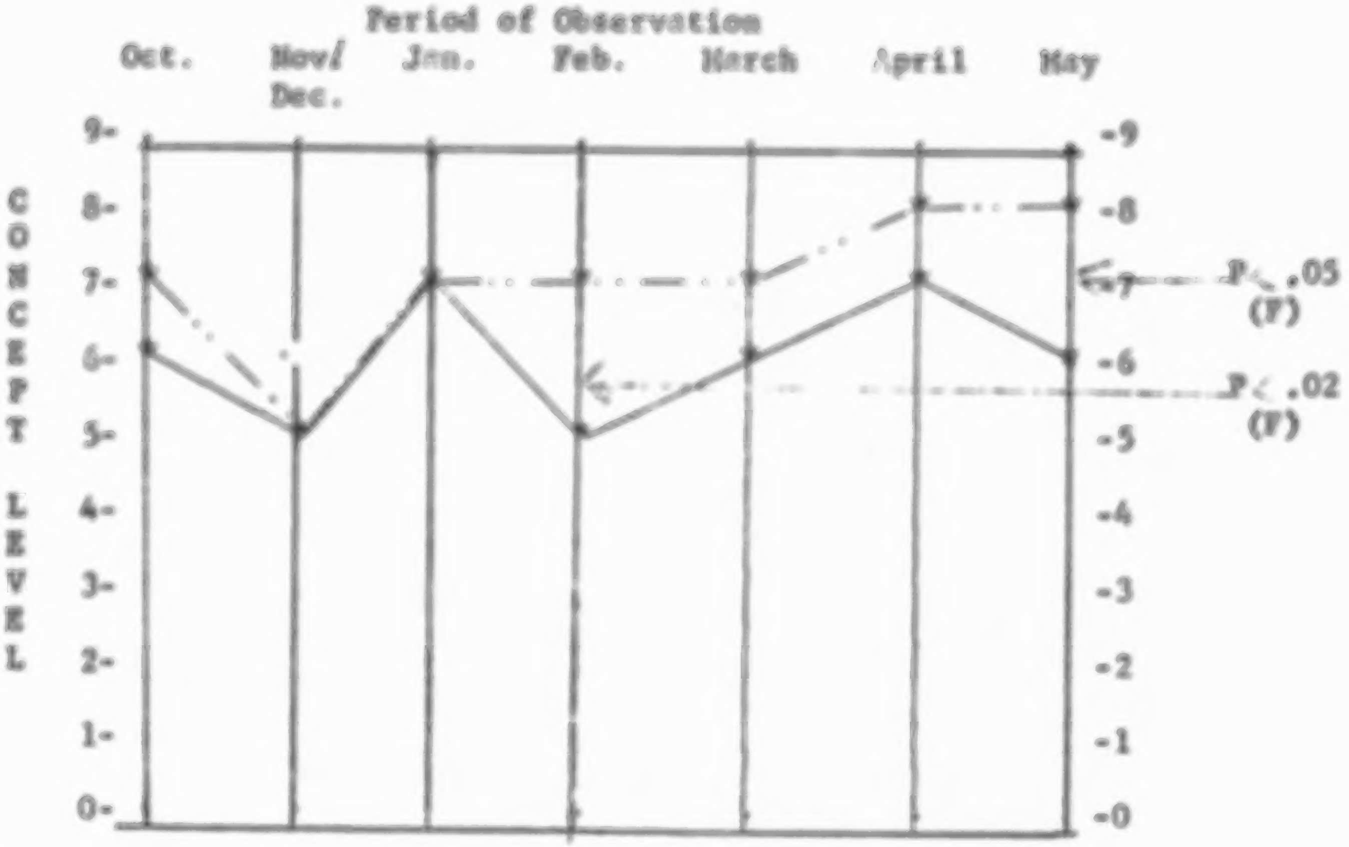
[c] Indicates that distribution which represented higher attainment in concept area.

CHART VII

Pattern of Median Scores in Attainment of Color Concept of All Extensive Subjects during kindergarten,[a] by Sex

Male ________

Female .._.._.._



	Oct.	Nov/Dec.	Jan.	Feb.	March	April	May
Male	108	111	106	101	102	90	104
Female	72	65	69	63	60	59	65
[b]Rated	180	176	175	164	162	149	169
Total Available	199	199	193	193	193	193	193

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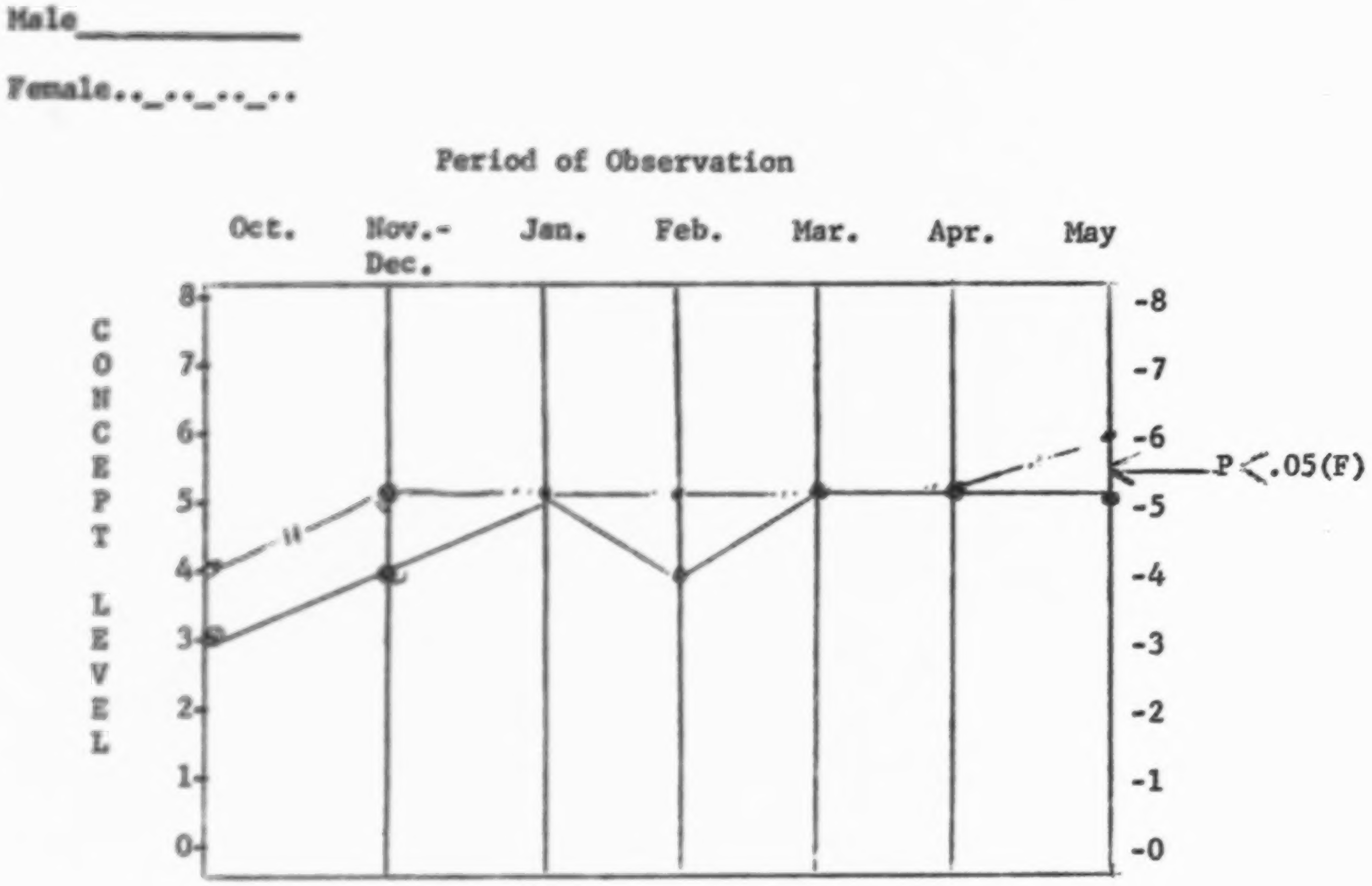
[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART VIII

Pattern of Median Scores in Attainment of Form-Space Concept of All Extensive Subjects during kindergarten by sex.[a]



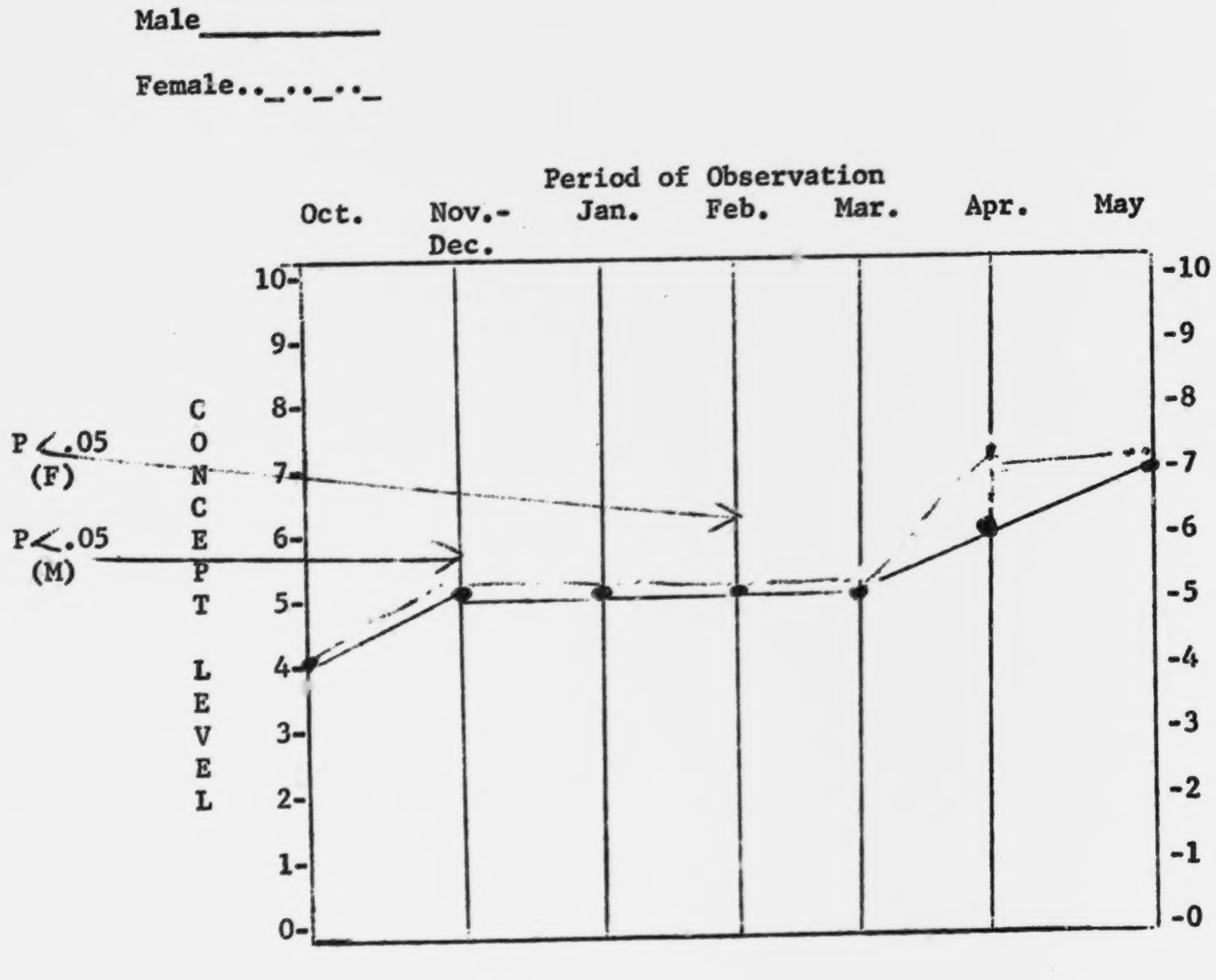
	Oct.	Nov.-Dec.	Jan.	Feb.	Mar.	Apr.	May
Male	108	108	105	105	106	88	102
Female	72	61	69	61	62	58	64
[b]Rated	180	169	174	166	168	146	166
Total Available	199	199	193	193	193	193	193

[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART IX

Pattern of Median Scores in Attainment of Grouping Concept of All Extensive[a] Subjects during kindergarten by sex.



Male	108	117	105	104	105	93	104
Female	70	72	68	68	65	58	64
[b]Rated	178	189	173	172	170	151	168
Total Available	199	199	193	193	193	193	193

[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

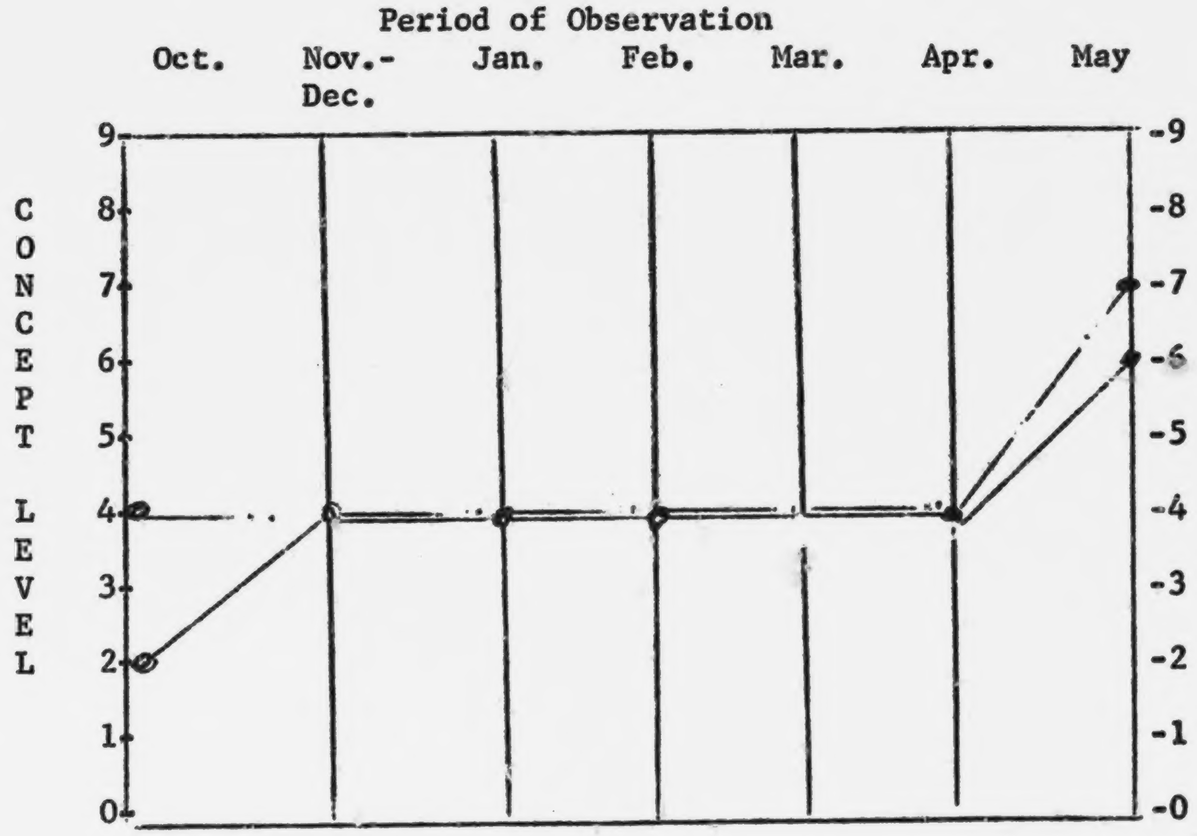
[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART X

Pattern of Median Scores in Attainment of Ordering Concept of All Extensive Subjects during Kindergarten by Sex.[a]

Male____________

Female.._.._.._..



Male	102	90	99	86	83	74	99
Female	69	59	66	53	53	47	64
[b]Rated	171	149	165	139	136	121	163
Total Available	199	199	193	193	193	193	193

[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

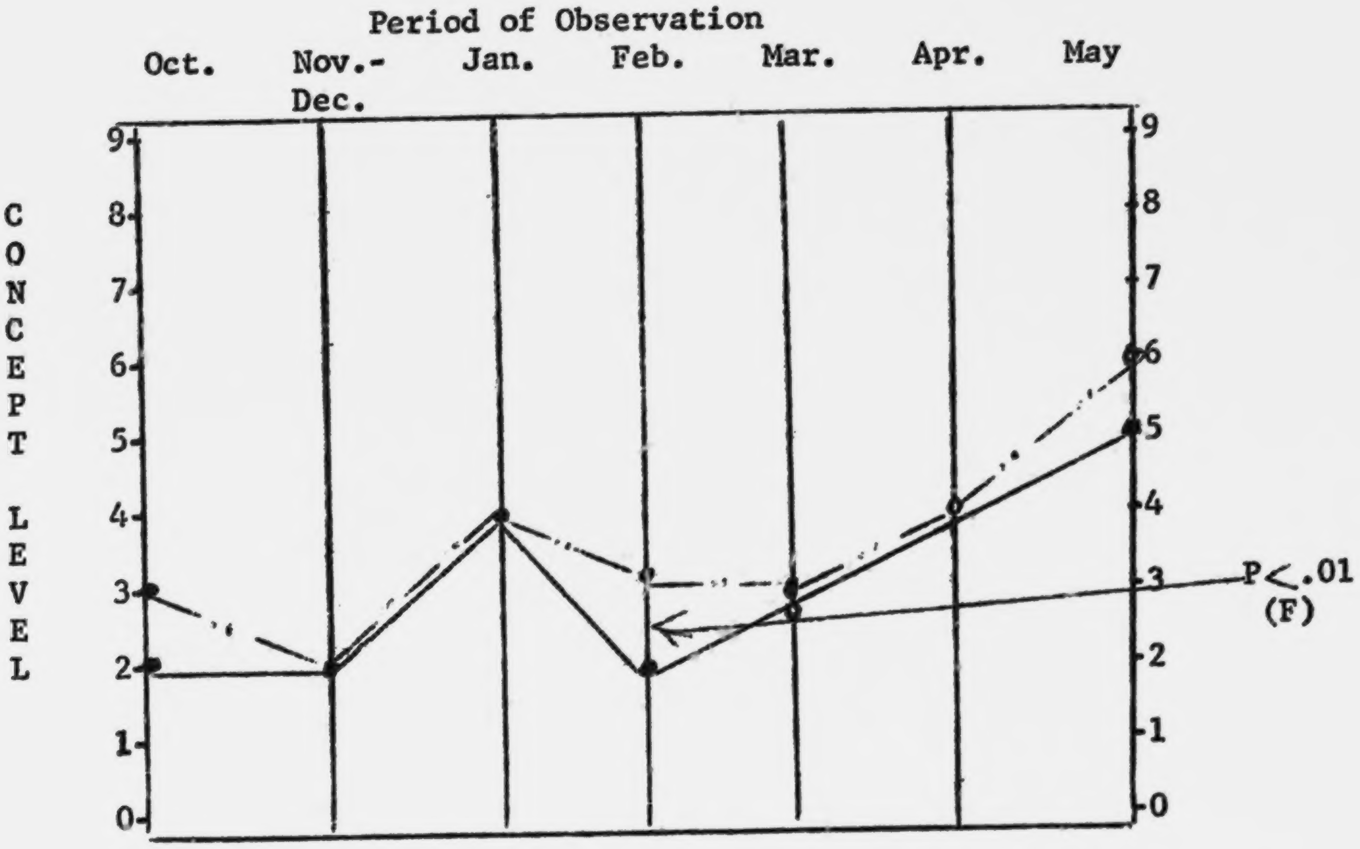
[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART XI

Pattern of Median Scores in attainment of Time Sequence Concept of All Extensive Subjects during Kindergarten by Sex[a].

Male____________

Female.._.._.._..



Male	106	109	105	103	103	88	101
Female	71	63	69	68	64	55	65
[b] Rated	177	172	174	171	167	143	166
Total Available	199	199	193	193	193	193	193

[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

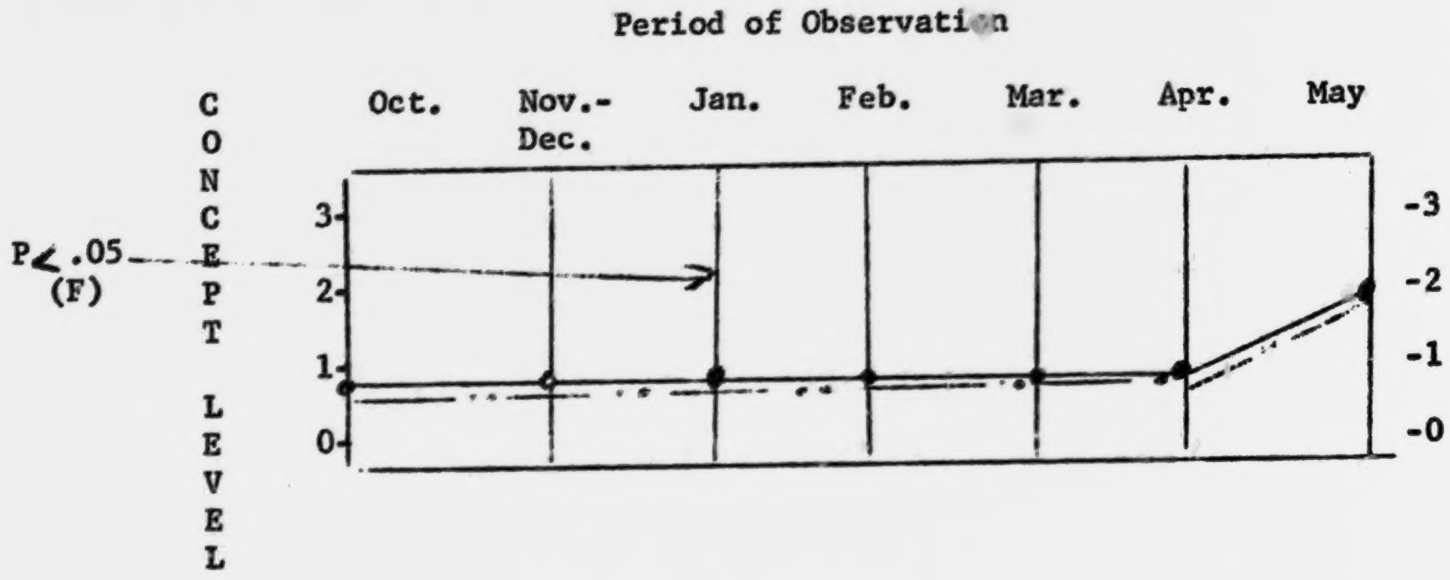
[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART XII

Pattern of Median Scores in Attainment of Time Duration Concept of All Extensive Subjects during kindergarten by sex.[a]

Male____________

Female.._.._.._..



	Oct.	Nov.-Dec.	Jan.	Feb.	Mar.	Apr.	May
Male	104	91	83	81	83	73	97
Female	66	59	62	57	55	53	61
[b] Rated	170	150	145	138	138	126	158
Total Available	199	199	193	193	193	193	193

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[a] The X^2 test was used to determine significance of difference between distribution of scores achieved by males and females.

[b] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

is a regression,(which in part may be related to using teacher and observer ratings), the girl's progress is steadily and gradually upward. There were significantly different relationships in favor of girls in both the February and the May measurements. At the end of kindergarten the girls showed the ability to choose realistic colors for drawings whereas the boys were primarily selecting colored objects on request with accuracy.

In the form-space area, Chart VIII demonstrates the girls' consistent and regularly higher level performance with a significant difference at the final measurement. The girls were able to achieve proportional representation of object and/or line; whereas the boys' median level indicated the ability to delimit space in their drawings and other form-space activities.

Chart IX discusses the attainment in grouping and here the boys and girls seem to be functioning pretty similarly. They are both able to finally achieve a matching and sorting of objects on the basis of similar underlying function.

In the ordering area, Chart X indicates that there were no significant differences between the boys and the girls at any point in time. This comment applies even though at the beginning and the end the girls showed some degree of higher level of performance as far as median scores were concerned. They were able to achieve at least the understanding of concept of equal units and the girls showed some recognition of numbers representing increasing quantity beyond the number five.

Again, the girls demonstrated more consistent and accelerated understanding of the time sequence concept. This is recorded in Chart XI . This is most clearly evident at the fourth rating period and again at the final rating period when the girls were able to understand the use of time words, whereas the median level of the boys indicated only a verbalization about the sequence of routine class events.

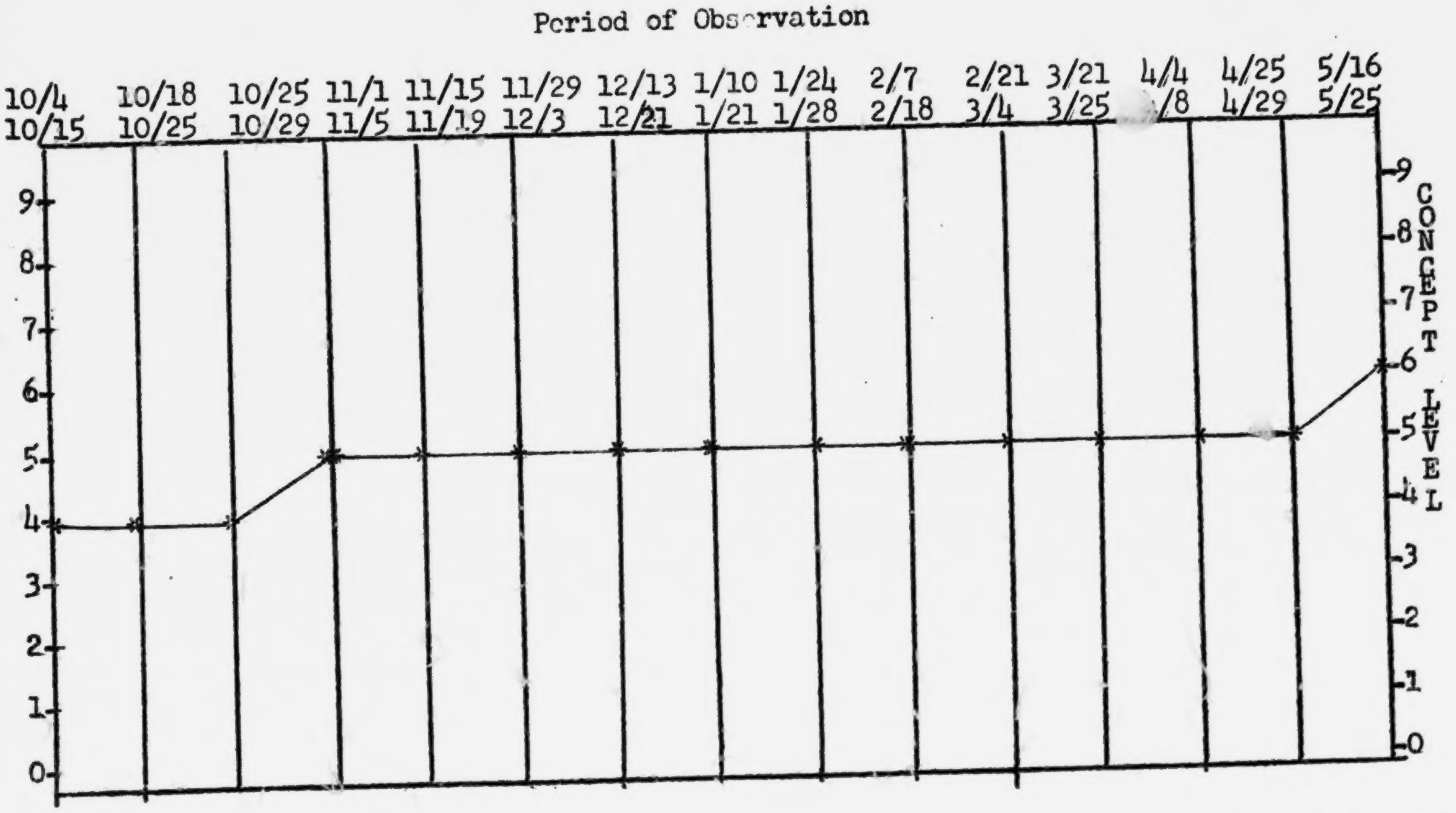
In the time duration area, Chart XII shows that the general understanding of the passing of time is pretty much represented by adjusting activities to meet the time demand. The girls and boys both moved to the next step by the end of kindergarten indicating that they can verbalize about their adjustments to the time demands.

D. Levels of achieving in the concept areas for children living in poverty areas.

At this time no comparative data is available comparing poverty children with children from other socio-economic areas on these ratings of concept attainment. Charts XIII through XVIII indicate the manner in which the children who were examined intensively took the steps through the concept areas. The Charts were developed by establishing the median scores for

CHART XIII

Pattern of Median Scores in Attainment of Color Concept for All Intensive Subjects during kindergarten.



Rated[a]	38	35	33	38	24	28	29	38	31	30	34	30	39	33	30
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

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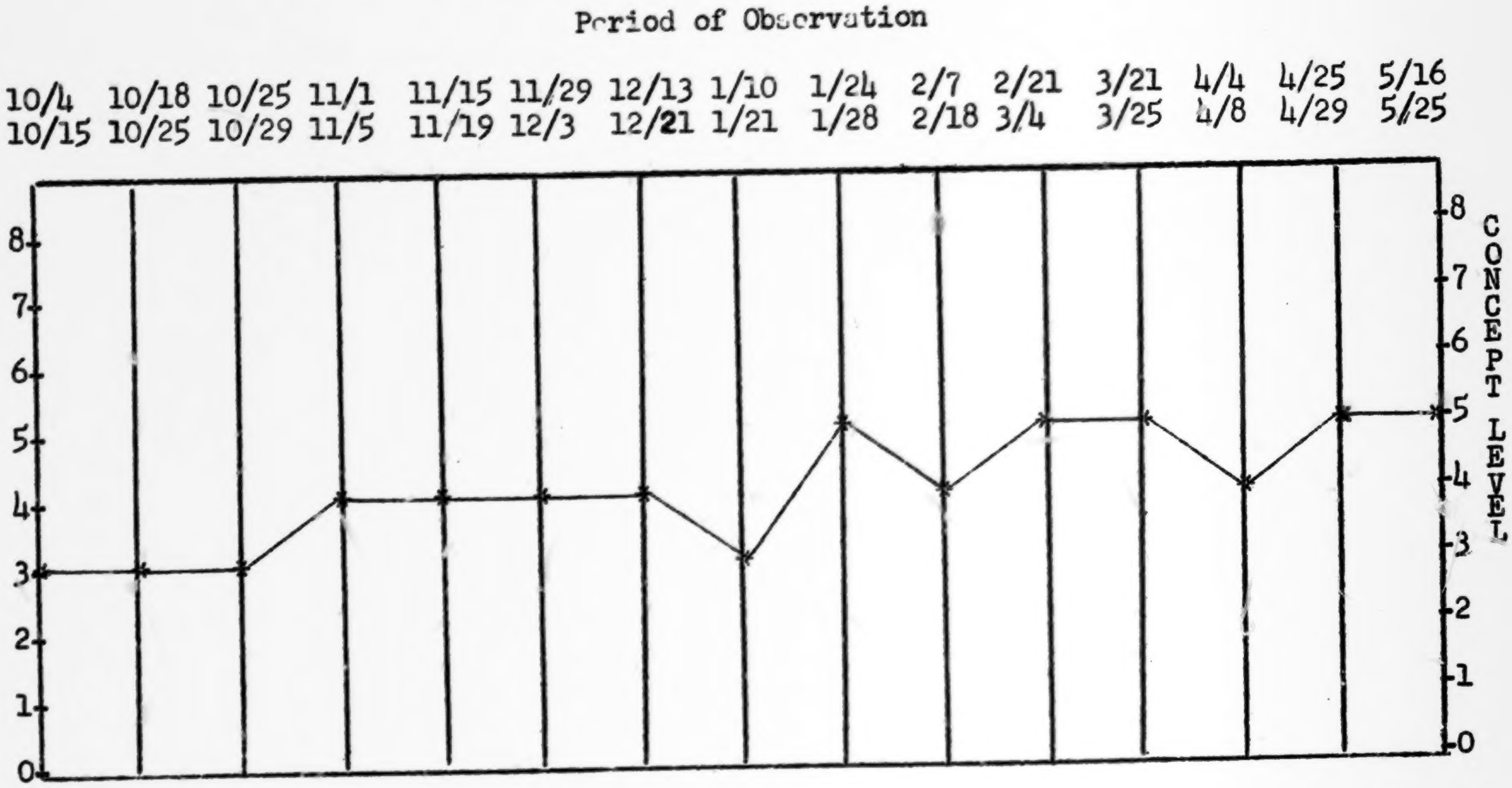
[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART XIV

Pattern of Median Scores in Attainment of Form-Space Concept for All Intensive Subjects during kindergarten.

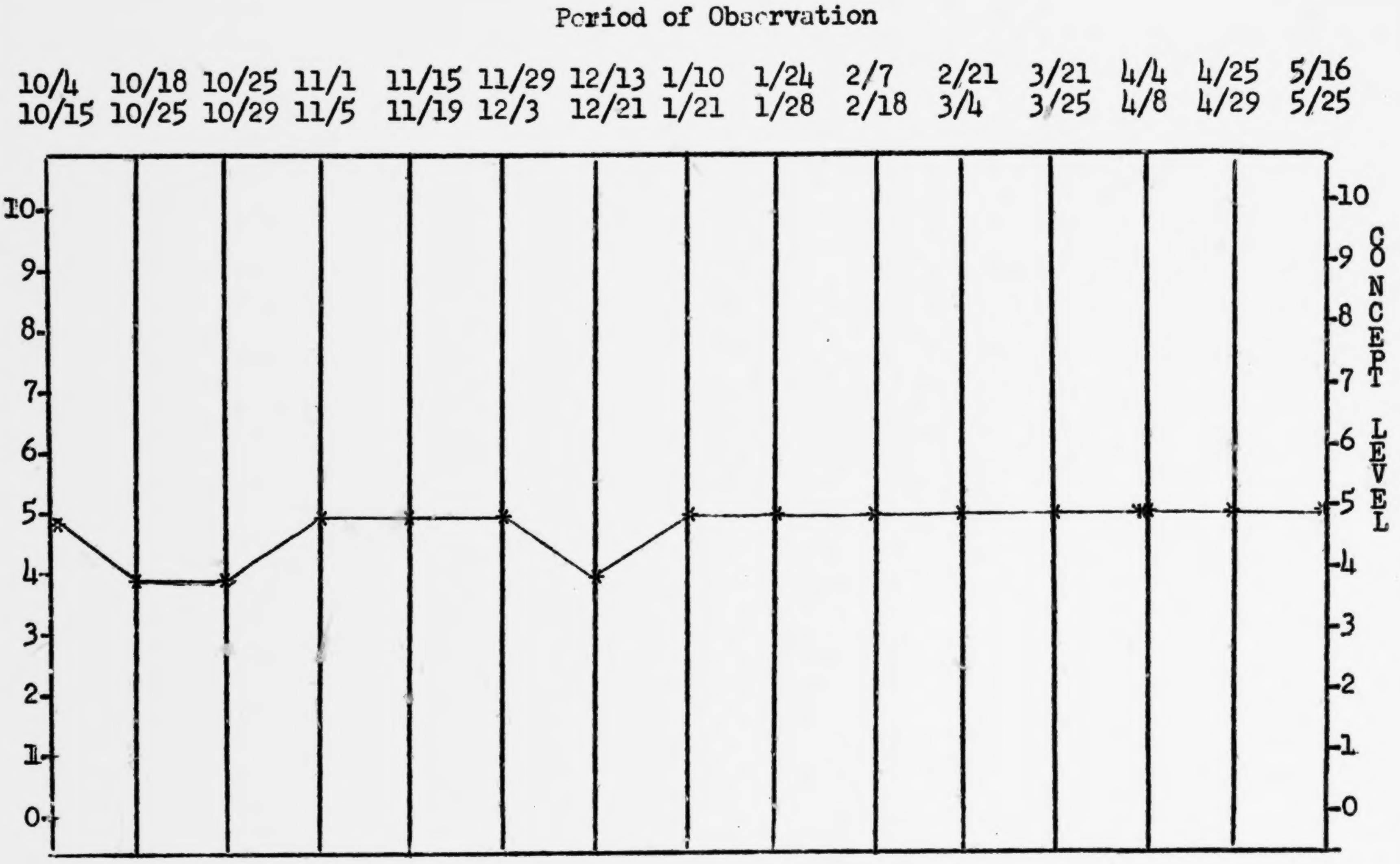


a Rated	35	34	36	33	28	33	30	30	28	30	31	35	40	32	35
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and/or occasional difficulties of observers in scheduling their observations.

CHART XV

Pattern of Median Scores in Attainment of Grouping Concept for All Intensive Subjects during kindergarten.

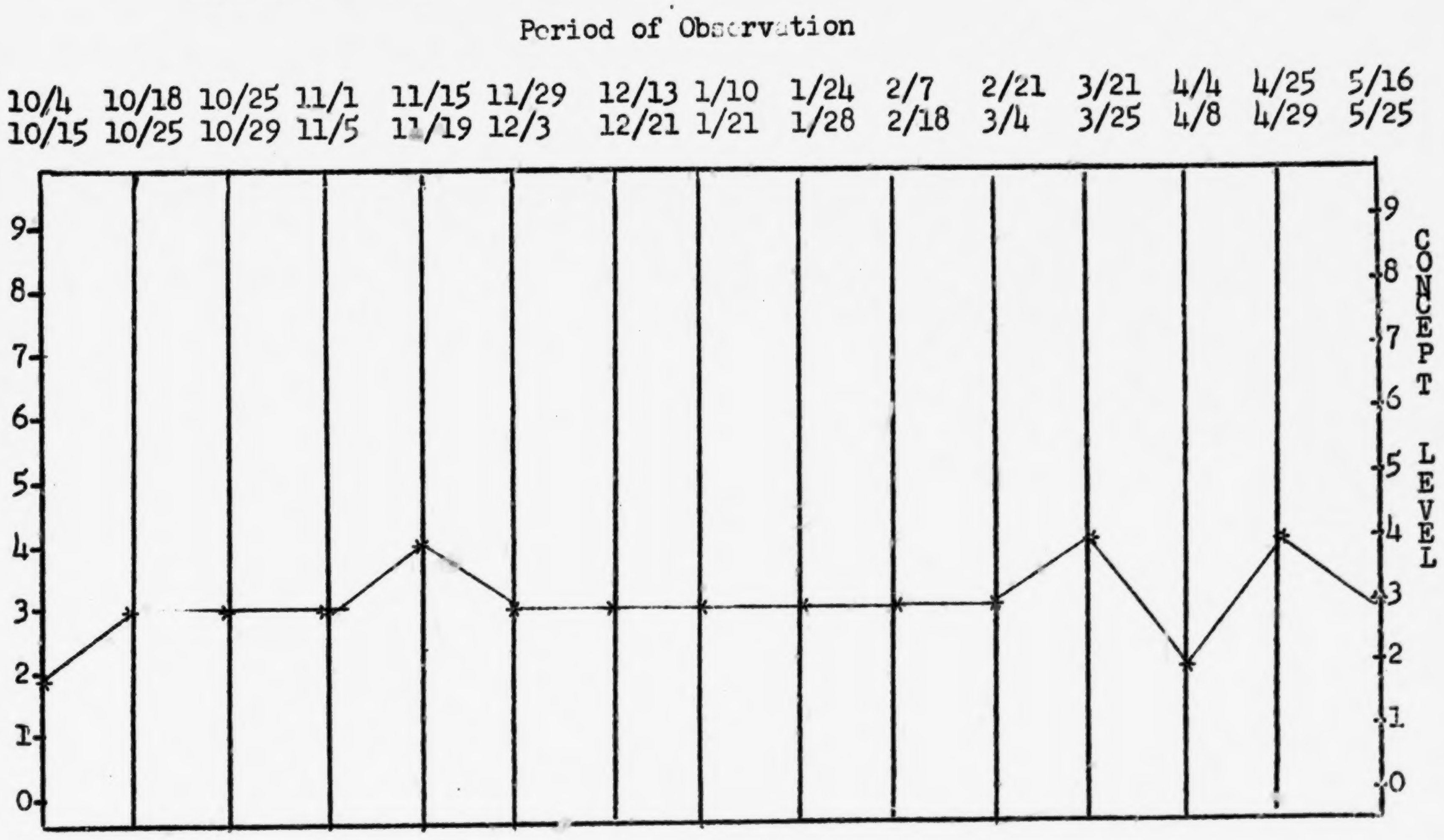


[a]Rated	48	41	36	42	32	40	35	41	33	37	35	38	42	27	44
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XVI

Pattern of Median Scores in Attainment of Ordering Concept for All Intensive Subjects during kindergarten.

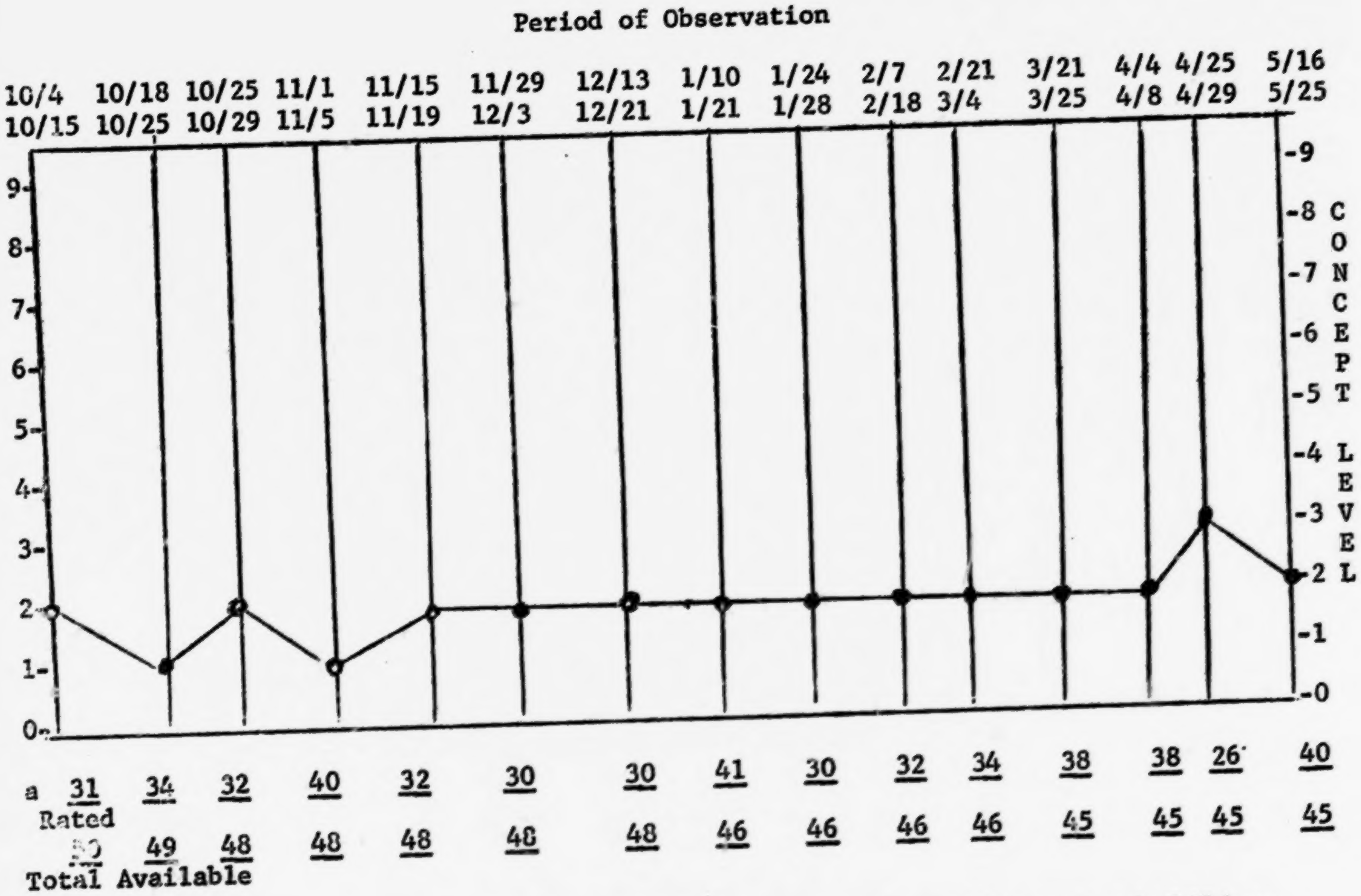


Rated[a]	29	31	37	29	29	33	36	35	35	32	35	32	33	38	34
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XVII

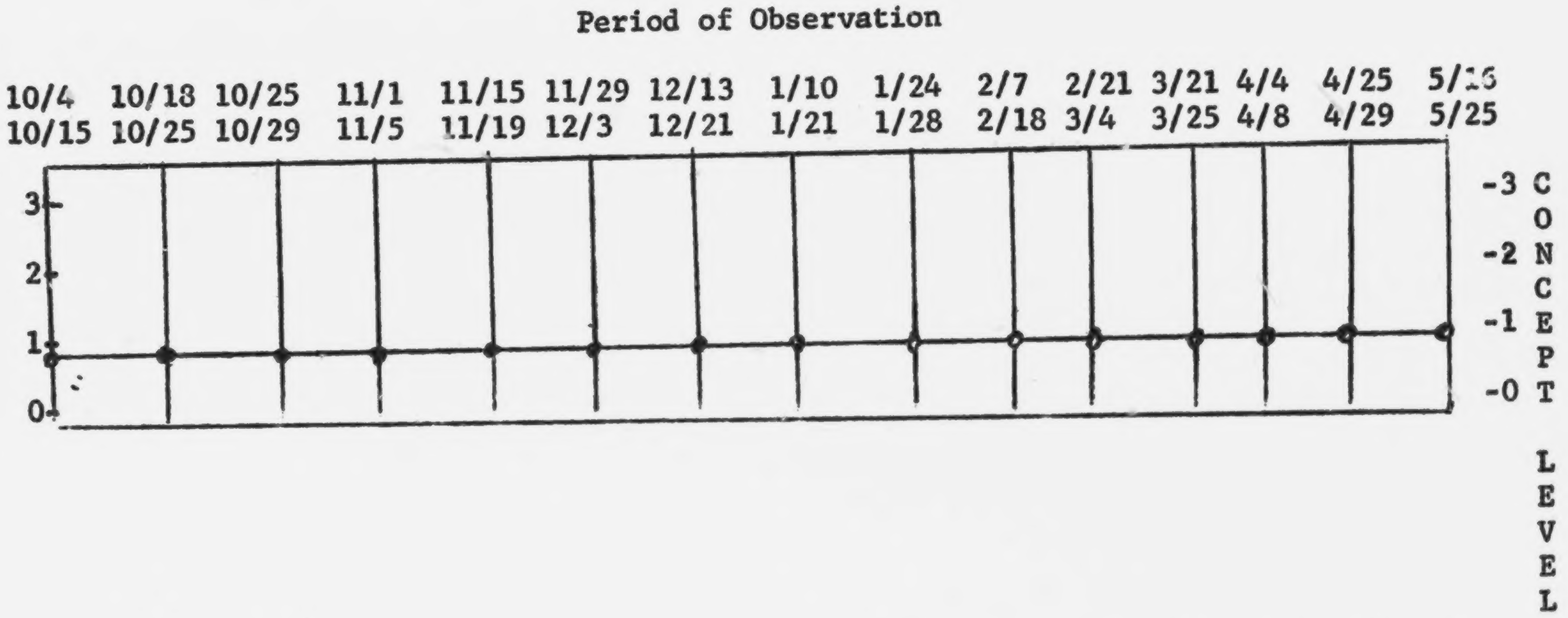
Pattern of Median Scores in Attainment
of Time Sequence Concept for All
Intensive Subjects during Kindergarten.



[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XVIII

Pattern of Median Scores in Attainment of Time Duration Concept for All Intensive Subjects during Kindergarten.



	10/4–10/15	10/18–10/25	10/25–10/29	11/1–11/5	11/15–11/19	11/29–12/3	12/13–12/21	1/10–1/21	1/24–1/28	2/7–2/18	2/21–3/4	3/21–3/25	4/4–4/8	4/25–4/29	5/16–5/25
Rated[a]	48	41	36	42	32	40	35	41	33	37	35	38	42	27	44
Total Available	50	49	48	48	48	48	48	46	46	46	46	45	45	45	45

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

all of the children who were ratable at the various points in time.

In the concept of color as indicated in Chart XIII the children begin by showing the ability to match color used by another person. After about two months of kindergarten the children move to the level of being able to choose a variety of color for their work and remain pretty much at that particular level throughout the kindergarten year until about the last month when they achieve the ability to name the color of objects on request.

Chart XIV examines the area of form-space and indicates that initially the children were able to articulate interrelated objects and/or lines and utilized such connections in their drawings. There is an increase through level 4 where the children are able to fill the space with recognizable representations. Attainment remains at this level until there is a slight regression which may well be related to the winter recess. Soon there is a recouping and advancing to the level of being able to limit space by the use of objects and lines. This level represents the final median achievement for the group. There are two points of regression that may reflect the usual pattern of growth. By the end of the kindergarten year, the median point returned to the level of delimiting space by using objects and lines.

Chart XV presents the development of the grouping concept area. The children seem to begin at level 5 which is the logical grouping according to the context of the situation. There is almost an immediate regression around the beginning of the year and then again right after the winter recess, and the median level returns to five (logical grouping in context).

As far as the ordering concept is concerned, Chart XVI indicates that the median level of the group is at about two which is the rank ordering of a set of objects along a previously determined dimension. There is almost immediate movement to the next level which seems to be the base level for the kindergarten year and this is the ability to rank order a set of objects on the personally determined dimension. Throughout the year there are a number of spurts and regressions. It is likely that shortly after kindergarten year the median level is likely to be the ability to recognize number as a representative of increasing quantity up to 5.

The time area is represented by Charts XVII and XVIII showing the children at the base line of development in this area. In the time sequence presentation (Chart XVII), the children show that they have been able to follow the teacher's established direction within a single class event. This level represents the achievement throughout the kindergarten period even though there are slight regressions at the beginning of the year and one slight spurt at the end of the year. It is likely that they are moving towards telling a sequential story or verbalizing about a sequence of events. As far as time duration is concerned (Chart XVIII), the most stable response is around the basic adjustment of activity to time demand. Wiggling around in their seats is one sign of this level of achievement and suggests an awareness of something happening in the near future.

Concept attainment ratings were completed on 50 intensive and 200 extensive subjects. There are some clear differences as one compares the final median level of functioning representing the two research samples. The most comparable ratings are the last observer rating of extensive group (8 month rating) and the final intensive rating. The following are the ratings: 1) Color - Extensive, 7, Intensive, 7; 2) Form-Space - Extensive, 5, Intensive, 5; 3) Grouping - Extensive, 6, Intensive, 5; 4) Ordering - Extensive 4, Intensive 3; 5) Time-sequence - Extensive, 4, Intensive 2; 6) Time-duration - Extensive, 2, Intensive, 1. All of these particular ratings are the median ratings for the total sample.

This study is the investigator's first attempt to determine the cognitive functioning levels of poverty kindergarten children. There will be further efforts to establish more accurately such levels. Such information will be very helpful in curriculum planning in pre-school and kindergarten situations.

E. Report on the study of effectiveness of HS parents as administrators of psychological tests.

A copy of the report on parents as testers was submitted with Progress Report II. Since that time a final form of the paper was submitted to the Journal of Consulting Psychology and will appear in either the August or October 1967 issue.

It is clear that individuals with high school or less training can carry out the administration of such tests as the Preschool Inventory and the Peabody Picture Vocabulary Test as well as sophisticated graduate students in clinical psychology. Currently, a staff of nine tester-observers (formerly HS parents) are being employed to assist in the assessment and individualizing of curriculum of two HS programs involving over 700 children. Their training and supervision is the responsibility of one staff psychologist.

V. Summary of Conclusions

It is quite evident that the HS child has responded very favorably to the stimulation that he received during the summer Head Start experience. In almost all instances, whenever there are indications of higher level performance during kindergarten, the HS group continued to be out in front of the NHS group. However, the impact as reflected by cross-sectional testing, demonstrates that as a group the HS children were not able to maintain the accelerated pace initiated through the summer experience. A subgroup of about 25% of the HS sample seemed to retain the positive impact and were consistently high kindergarten performers.

Some of the indications in this study suggest that the HS child shows much greater variability in his conceptual development. The pattern of these spurts and regressions may indicate a stronger orientation for growth. Further, the HS child seems to have shown more responsiveness to the educational event which includes reactions to his teacher.

The HS teacher status does not seem to have any overall effect in increasing the functioning of the children in her class. However, there is an indication that the HS child tends to perform better in the areas of color and form and possibly grouping when he is within the NHS teacher's class. In the HS teacher's class, the HS child seems to achieve in the more organizational areas which is best reflected in increased verbal facility in the time sequence and ordering concepts. Thus, there is the suggestion that the NHS teacher may have emphasized the color and form-space areas (skills) and the HS teacher made additional demands in the time sequence and ordering areas (organizational-verbal). These conclusions are highly tentative and would require further study.

The teachers' ratings show a bias toward positive change in that they tend to use higher levels on the rating scales than the observers. This is quite consistent with the findings in other research, i.e., the person who does the job will want to see more positive change in his charges, clients, etc. and, therefore, will rate in that direction.

The results of this study raise the question of the maintenance of the impact of a stimulation experience. Follow-up studies and evaluation of demonstration projects report the phenomenon of the gradually decreasing gap of success between the experimental and control groups. This study, in part, presents a consistent picture. However, special emphasis is directed to the approximately 25% who were highly responsive to the stimulation of the summer. It may be that this more responsive child is brighter or at least can retain the better educational orientation achieved through the summer experience. He seems to conform to the particular emphasis of the teacher.

The greatest amount of change in the total group was seen in the development of the color concept and probably the next most in the areas of grouping and ordering. The form-space concept seems to be more related to constitutional factors and possibly for this age group sustained changes through stimulation should not be expected. Although placing demands on the child did produce higher performance in the form-space area, the increased functioning was sustained only when there was continuous reinforcement. This finding was mainly suggested by the lowered functioning in the form-space concept after periods of long absences from school, such as during winter and spring vacations.

Generally speaking, girls appear to be higher concept attainers during the kindergarten period. There was only one instance (grouping during November-December rating) of males showing significantly higher attainment. In color, form-space, time sequence and duration, the girls showed higher achievement at certain times during kindergarten. Even in grouping, during the February rating the girls surpassed the boys. It should be recognized that the basis for this higher level of success was not examined in this study.

4. Finally, this study suggests that children, at least those coming from poverty areas, are able to function at the following levels by the time they have completed kindergarten:

A. In the color area, they can achieve the level of naming colors on request.

B. In the form-space area, they can achieve at the level of delimiting of space using objects and line.

C. In grouping, they are able to establish logical groupings according to the context of the material.

D. In the ordering area, they can achieve at the level of rank ordering of a set of objects on a personally determined dimension.

E. In the time area, the children have been able to learn to follow the teacher's established order within a single class event and also seem to make some minimal adjustments in activity related to certain time demands.

To summarize, the Summer Head Start experience clearly increased the children's level of achievement as measured at the end of the summer program and during the first few months of kindergarten. The differences that were seen beyond such a period were evidently produced by a more responsive 25% of the HS group. 5. Head Start seems to establish a more positive orientation to learning within the school situation. The orientation is more clearly retained by the more responsive and/or possibly more conforming group.

APPENDIX A

Rating Manual
Rating Scales

INTRODUCTION

This manual is to be used as an aid to teachers and observers in making the evaluation of attainment in the five concept areas under study. The primary use of the manual will be to increase the accuracy of the monthly observations and ratings.

It is important to recognize that we are interested in the highest level that the child has achieved during the period under consideration. It is necessary to give an actual example of the child's behavior as support for this particular rating. In the event that there is difficulty in arriving at an agreed upon level several examples may be recorded so that a judgment may be made subsequently. In the event that there is no observed or recalled behavior that can be used for the rating of the particular concept, it will be recorded as zero.

It will be noted that within each of the levels of concept attainment multiple examples are given. These may vary or appear to vary in their range of difficulty; however, if the child is able to achieve any of these he is given credit for attaining that particular level. For example, in the grouping area, it is likely that a child can do a bead pattern, but may not be able to print a series of letters to form a word such as his name. Both of these involve the grouping of something related to the context and therefore would receive the rating of 5.

Since much of the child's behavior in the classroom is associated with the teacher's direction, many examples have been based on these types of interactions. For example, the teacher may be sure that the child is able to copy a circle which she has put on the blackboard and thus it is important to indicate that this behavior is carried out under the direction of the teacher. It should not be assumed that the child is able to make the circle on his own just because he is able to follow the directions of the teacher.

Please consider the examples that are given under each level as indications of the types of behavior which might be subsumed. It has been attempted to select examples that come from the direct observations of the children within the classroom. Needless to say, these do not exhaust the possibilities, but hopefully, represent a good range of them.

DEFINITIONS

A. Color

Definitions: Any behavior that is related to the reaction to ur use of color will be considered as potentially associated with the color concept. The primary response is one involving the spontaneous recognition of one color and gradually becomes more complex until the child uses appropriate names for color blends and actually blends colors in painting and/or drawing.

B. Form-Space

Definition: Any behavior in which shape is relevant will be considered as an expression of this concept. This may include the drawing of a line, the piling of dishes or blocks, the working of puzzles, making designs out of paper, etc. The primary response may be the drawing of unrelated circles and/or lines, trial and error success in placing forms in a form board, or simple stacking of the blocks. The more complex effort might include the intricate development of a city from blocks, the working of a difficult puzzle using form clues, or the drawing of various geometric figures with an eye toward symmetry and/or perspective.

C. Grouping

Definition: This concept involves bringing together two or more discrete events or objects and/or their symbols by demonstrating the underlying relationship between them. The primary response might include the choice of similar blocks, the matching of pictures or letters of the alphabet. The more complex grouping behavior can include grouping in context as the drawing of arms and legs on a body, the successful completion of a bead pattern, or grouping by indicating differences between objects, etc. Finally, verbalizations about grouping include defining words by similar characteristic or function or relating a single object to two or more classes.

D. Ordering

This concept involves any behavior related to the ordering of objects or events on some dimension or dimensions. The primary response might include rote counting or rank ordering of a set of objects from little to big, or the placing of the correct number of crayons boxes around a table. The more complex behavior might include the performance of arithmetic operations combining groups of numbers; the recognition that two of one object equal one of another; and the rank ordering of a series of subclasses.

E. Time Sequence

This concept involves the ordering of events with some reference to the passage of time. The primary response might be recognition that one event comes after another as asking for paper as the step before drawing or telling of a sequential story as it relates to events that have recently occurred. The more complex behavior might be the drawing of a series of pictures involving a sequential relationship, the arrangement of picture in a sequence to tell a story without teacher assistance, or reference to sequence in future events.

F. Time Duration

This concept involves the sensing of the passage of time especially as it relates to the immediate future or past. The primary expression of this concept might be the anticipation of coming events by "getting ready" behavior or working faster when met with a feeling of "it must be done within a certain amount of time." The more complex expression might be the awareness of the difference between short and long periods of time.

Concept: COLOR

1. SPONTANEOUS REACTION TO COLOR.

This involves simple facial reactions or changes of expressions by a child when he sees colored objects.
EXAMPLE: Expressions such as "Oh!"; Pretty!"; widening of the child's yess or pointing to the colored object in question.

2. OBSERVING OTHERS' USE OF THE CHILD'S CHOOSING OF COLORED MATERIALS.

This involves a child's watching other children using colored materials or indiscriminantly using colored materials in play.
EXAMPLES:
1) Uses many colored beads or pegs in play although not deliberately selecting any one of them in particular.
2) Names one or more colors not necessarily correctly; such as calls all colors red. Knows a color word.
3) Paints with all colors. Colors with all crayons.

3. SHOWS PREFERENCE FOR A SPECIFIC COLOR IN A SPECIFIC SITUATION.

This involves a particular color intentionally when several colors are available.
EXAMPLES:
1) The child chooses to paint his picture red although other colors of paint are available.
2) The child looks carefully at the crayons in his box and finally draws his picture with yellow and red.
3) Child can choose 1 to 3 colors when asked.

4. MATCHES COLOR USED BY ANOTHER PERSON.

This involves matching another person's selection of color and/or repeating of the name of the color he has matched.
EXAMPLES:
1) Teacher draws a tree trunk brown and child does same.
2) Teacher says, "red" and he repeats "red" as he holds up a red crayon.
3) Child is able to name the color of one to three objects correctly.

5. CHOOSES A VARIETY OF COLOR FOR HIS WORK.

This involves using a series of colors without any particular regard to form although he is purposeful in selecting colors.
EXAMPLES: Selects red for sun, yellow for house, blue for grass, etc.

6. SELECTS COLORED OBJECT ON REQUEST.

This involves recognizing color names and choosing the correct color.
EXAMPLES:
1) Child is able to choose objects of four to eight colors.
2) Teacher asks child to give her the red ball and the child performs this task.

7. NAMES COLOR OF OBJECTS ON REQUEST (Five or More).

This involves knowing the names for a number of colors.
EXAMPLES:
1) Child is able to name the color of 4 to 8 objects.
2) Child can name all his crayons.

8. CHOOSES REALISTIC COLORS FOR DRAWING.

This involves selecting appropriate colors by the child with no teacher direction.

EXAMPLES:

1) Uses realistic colors in his drawings either occasionally or generally.

2) Child uses orange for sun, blue for sky, green for grass, etc.

9. NAMES BLENDS OF COLORS IN DESCRIBING COLORED OBJECTS.

This involves the child's spontaneous naming of color blends or the deliberate use of them in making a painting.

EXAMPLES:

The child says:

1) "That's a brownish-green house".
2) "Your shirt is light green", etc.

Concept: FORM - Space

1. NON-CONTINUOUS USAGE OF OBJECTS OR LINE (Exploration and trial and error).
This involves the trial and error exploration with any materials that the child may have available.
EXAMPLES:
1) Puzzle: placing objects in space
2) Drawing: scribbling
3) Blocks: indiscriminate piling and handling.

2. INTENTIONAL REPRESENTATION OF SINGLE OBJECTS AND/OR LINE.
This involves the completion of a planned act demonstrating that the child can form one thing with objects or lines.
EXAMPLES:
1) Puzzle: placing objects into inserts - formboard-type puzzle, squares, circles and triangles.
2) Drawing: draws circles and/or lines on paper.
3) Blocks: builds a tower or row.

3. ARTICULATION OF INTER-RELATED OBJECTS AND/OR LINE.
This involves appropriately bringing together 2 objects and/or lines so that there is a meaningful representation .
EXAMPLES:
1) Puzzle: correct placement of easy pieces (ex. simple duck puzzle) or efforts to use picture clues on a puzzle of medium difficulty without successful completion.
2) Drawing: Correcting circles or lines (ex. drawing a person with body and limbs, head and body, or head with features).
3) Blocks: simple bridge and wall; row with two levels or more.

4. FILLING OF SPACE WITH INTENTIONAL REPRESENTATION OF OBJECTS AND/OR LINE
This involves a more elaborate use of representation. (Making a ~~pi~~picture.)
EXAMPLES:
1) Puzzle: combination of form clues and trial and error to complete puzzle of medium difficulty.
2) Drawing: makes a human figure like a stick form with the arms and legs attached to a body; makes letters of the alphabet.
3) Blocks: builds walls or roads with a variety of blocks of one kind laid in different directions.

5. DELIMITATION OF SPACE USING OBJECT AND/OR LINE.
This involves the more appropriate defining of the making of things within certain limits, yet includes elaborate representations.
EXAMPLES:
1) Puzzle: easy completion of puzzle using form-clues--medium puzzle well learned.
2) Drawings: relates objects or portions of objects to each other; as makes figures drawing with more detail such as fingers, hands, feet, hair or clothing. (At least two of these details.) Makes first geometric approximations in drawing of houses. Makes borders around his pictures.
3) Blocks: makes enclosures - simple house-like structures, repeatedly constructed models such as fire truck, gas station.

6. PROPORTIONAL REPRESENTATION OF OBJECT AND/OR LINE.

This involves the use of balance and detail so that the representations are generally more proportioned.

EXAMPLES:
1) Drawing: Draws well proportioned body with dimensionality of limbs. Draws well defined angles in square, rectangles; and the triangle appears in his drawing.
2) Blocks: Delineation of detail as contrasted to repetitive building of functional structures; with balance, symmetry, representational detail (as windows, chimney, etc.)

7. ANGULATION - DIFFERENTIATION BETWEEN 90 DEGREES AND OTHER SIZED ANGLES.

This involves the awareness of more complex angles and the use of these in drawings.

EXAMPLES:
1) Drawing: Drawings are made with objects in their proper portions; with awareness of more complex angulation.

8. THREE DIMENSIONAL REPRESENTATION.

This involves the representations that go beyond the two dimensional and convey the idea of depth.

EXAMPLES:
1) Drawing: Figures of drawing are well proportioned and convey depth and perspective in relationship to the scene drawn.

Concept: GROUPING

0

1. SELECTS FROM AVAILABLE MATERIALS SOME RELATED ITEMS FOR PLAY (Objects related to one another).

   This involves choosing objects that go together.

   Examples:
   1) Plays dress-up and uses various items of clothing--shoes, hat, purse, etc.
   2) Plays with kitchen equipment--pots and pans, dishes, coffee pot, etc.
   3) Chooses paper and crayon for drawing.

2. PLACING OBJECT IN APPROPRIATE LOCATION IN CLASSROOM.

   This involves knowing the appropriate location of a particular object in the room and being able to place it there.

   Examples:
   1) Puts crayons back in their proper storage space.
   2) Says "There is no milk in my carton" (This illustrates an awareness of the presence-absence phenomena.)
   3) Returns dolls to doll corner, dishes to cupboard.

3. INTENTIONAL PAIRING OF OBJECTS OR EVENTS RELATED ON THE BASIS OF PERCEPTUAL QUALITIES.

   This involves bringing together two objects or events by seeing or hearing or feeling the similarities.

   Examples:
   1) Selects pictures that look alike.
   2) Matches rhythm to sounds (hop, skip, jump to music).
   3) Identifies numeral with appropriate sound (this answers the question of "how many?")
   4) Says alphabet (name) when sees appropriate letter.
   5) Names similar objects such as "Window for square.
   6) Spontaneous selection of a series of similar beads to string by color or form.
   7) Chooses a partner for a game (grouping of self with another child).

4. INTENTIONAL PAIRING OF A LINGUISTIC SYMBOL WITH THE RELATED OBJECT OR EVENTS (symbol for some thing)

   This involves intentionally bringing together a word and the object or event it stands for.

   Examples:
   1) Matches name tag to self.
   2) Matches word (such as go, stop, etc.) to appropriate action.
   3) Symbolic naming of geometric forms (circle, square, triangle)

5. LOGICAL GROUPING IN CONTEXT.

   This involves putting things together while being aware of background factors.

   Examples:
   1) Child puts place setting of dishes on a table.
   2) Child places furniture setting appropriately in doll house.
   3) Illustrates the grouping of two arms, two legs, two eyes, etc. in drawing a person.
   4) Places two windows and a door in a house.
   5) Places wheels on a car he is drawing.
   6) Uses context clues to work puzzles.
   7) Matches a pattern by color and form.
      a) Successfully copies parquetry blocks to designs.
      b) Copies bead patterns.
   8) Prints name or word grouping letters to make a whole word.

6. DIFFERENTIATING GROUPS OF OBJECTS OR EVENTS BY CONTRASTING CHARACTERISTICS (nonverbal).

This involves the nonverbal understanding that objects or events may be grouped based on differences.

Examples:
1) Boys vs. girls.
2) Right vs. left.
3) Big vs. little.
4) Identifies what is "missing when playing games where Teacher takes something away.
5) Uses different shapes of blocks for different parts of buildings such as triangular blocks for "roof and rectangular blocks for "wall".

7. MATCHES, SORTS, OR REFERS TO OBJECTS ON THE BASIS OF A SIMILAR UNDERLYING CHARACTERISTIC OR FUNCTION (Objects must be present).

This involves the understanding of similarities between objects based on some general underlying factor, or knowing and saying what an object is used for.

Examples:
1) Understanding of concepts related to what objects are made of when object is present. "This is made of wood".
2) Apples, balls and balloons are round (roundness)
3) Ice and snow are cold (coldness)
4) Rocks and metal are hard.
5) Indicates the underlying characteristic of one or more objects by make-up such as shape, hardness, sweetness.
6) Identifies use of object when object is present. "This truck is for hauling garbage."

8. DEFINES WORDS IN TERMS OF CHARACTERISTIC OR FUNCTION

This involves the understanding of grouping things under the same term depending on the function that suggests the similarity. (Objects need not be present.)

Examples:
1) "Cranes are to lift things."
2) "Police are to help people cross the street."
3) "The farmer is to take care of the animals."

9. RELATES A SINGLE OBJECT TO TWO OR MORE CLASSES.

This involves the recognition of two or more ways of grouping a single object depending on the characteristics of the object.

Examples:
1) Matches by color and form. For example, child groups blocks into square blues, round blues, round reds, and square reds.
2) Child says "An orange is like a ball (round) and like cake (food)."

10. MODIFIES A GROUPING CONCEPT IN LIGHT OF NEW EXPERIENCE.

This involves more discrimination in grouping the same object based on more information about the object.

Examples:
1) Some farm animals can be pets.
2) Some mothers go to work.
3) Some birds do not fly south in the winter.

D

Concept: ORDERING

1. ROTE COUNTING OF OBJECTS.

This involves the mere ability to count a series of objects without mentioning a total.

EXAMPLES: 1) Child counts number of children at his table, but does not say, "There are five children altogether".

2. RANK ORDERING OF A SET OF OBJECTS ALONG A PREVIOUSLY DETERMINED DIMENSION.

This involves arranging or describing objects according to some standard.

EXAMPLES:
1) small to large
2) heavy to light
3) short to tall
4) elliptical to round
5) thin to fat (for example, child says, "She has a skinny ball".)
6) successfully completes color cone
7) successfully completes number peg board.

3. RANK ORDER OF A SET OF OBJECTS ON A PERSONALLY DETERMINED DIMENSION.

This involves arranging or describing objects according to a determined pattern by the child himself.

EXAMPLES:
1) small to large
2) heavy to light
3) tall to short
4) elliptical to round
5) thin to fat
6) the alternation of these concepts such as the placing of short and long strips on a sun to make rays.
7) Under-over or behind-in front of.

4. RECOGNITION OF NUMBER AS REPRESENTATIVE OF INCREASING QUANTITY UP TO 5.

This involves the ability to produce the correct number of objects up to 5.

EXAMPLES:
1) Place correct number of crayon boxes on a table.
2) Child can give correct number of crayons when someone asks for them.
3) Child says, "Give me two crayons" or "Give me three blocks".

5. UNDERSTANDS MORE THAN AND LESS THAN IN NUMBERS.

This involves the notion of understanding "more" or "less" using number concepts.

EXAMPLES:
1) Child says, "There aren't enough chairs".
2) Child says, "There are more children than milk cartons".

6. UNDERSTANDS CONCEPTS OF EQUAL UNITS.

This involves the understanding of how one group of things might be equal to another group of things.

EXAMPLES:
1) Child recognizes that two of one block make one of a larger block.
2) In music or games child moves from one group to another to make equal units.
3) Child recognizes that two ½'s make a whole.
4) Child uses notion of equal units in measuring things such as "The tower is two blocks high" or "The line is three crayons long" or "I am as tall as this ladder".

7. RECOGNITION OF NUMBERS AS REPRESENTATIVE OF INCREASING QUANTITY UP TO 10

This involves knowing how many objects each number stands for up to 10.
EXAMPLE: 1) This table needs seven boxes of crayons.
2) "I have five apples and I need one more to make it six".

8. ARITHMETIC OPERATIONS WITH NUMBERS 10 AND BEYOND

This involves the use of arithmetic operations with numbers 10 and beyond.
EXAMPLES: 1) "Five apples and five apples make ten all together".
2) "Ten cents from twenty-five cents leaves fifteen cents."

9. RANK ORDERING OF OBJECTS OR EVENTS WITHIN A GENERAL CLASS.

This involves the holding of two dimensions in mind as the child is establishing the order within both dimensions.
EXAMPLES: 1.) Child divides farm animals into pigs, cows, chicken, etc., and then further divides these animals according to size.
2.) Stating that an object is behind and under another object.

Concept: TIME SEQUENCE

1. IMITATES TEACHER'S ESTABLISHED ORDER WITHIN A SINGLE CLASS EVENT.

This involves merely following the routine established by the teacher when told.

Examples: 1) Child begins to clean-up when Teacher sounds piano and reminds them to clean-up.

2. CHILD HAS LEARNED TO FOLLOW TEACHER'S ESTABLISHED ORDER WITHIN A SINGLE CLASS EVENT.

This involves following the routine established by the Teacher without being told.

Examples: 1) Child begins to clean-up when Teacher sounds piano but gives no verbal reminder. Child puts toys away and goes spontaneously to next activity.

3. TELLS A SEQUENTIAL STORY OR VERBALIZES ABOUT A SEQUENCE OF EVENTS.

This involves the child's ability to tell a story that has a time sequence in it or to tell about a previous event that involved some sequence of acts.

Examples: 1) Child tells story about recent events in the home, such as "I was playing with my cousin and we were running in a circle and I fell down."

2) Child tells story such as "The Three Pigs" or "The Gingerbread Man".

4. USES TIME WORDS (without verification).

This involves the use of the notion of time as the child compares his speed or slowness with other children.

Examples: 1) Says "I beat you" in reference to finishing first.

2) Says "I'm finished" when completing a task.

5. VERBALIZES ABOUT THE SEQUENCE OF ROUTINE CLASS EVENTS (a time word may be used here).

This involves a direct, spontaneous reference to some of the routine sequences that have to do with the passing of time or the denotation of time.

Examples: 1) "We didn't have snack today."

2) "It's time for recess."

3) "Isn't it time for milk?"

6. UNDERSTANDS THE USE OF TIME WORDS (with verification of teacher or observer).

This involves the clear understanding of the use of time words applied accurately to known previous or subsequent events.

Examples: 1) Correctly tells about previous events. "Yesterday we went to the zoo" or Before I was playing with the dolls" or "I am one year older".

7. ARRANGES PICTURES IN SEQUENCE TO TELL A STORY (spontaneous)

This involves the ability to arrange pictures in order so that they portray the appropriate sequence.

Examples: 1) Arranges the story of the Three Bears on the felt board in proper sequence.

8. REFERS TO SEQUENCE OF FUTURE EVENTS.
This involves clear understanding of events of the future by making accurate reference to them.

EXAMPLES: 1) Says "When we go first we'll take the bus and it will take us to the zoo and then we'll see the animals".
2) Says "When I have my birthday I will be six."

9. DRAWS A SIMPLE SEQUENCE OF EVENTS IN PICTURES.
This involves the actual drawing of a simple sequence of events of the child's own creation.

EXAMPLE: 1) Draws a picture of a little boy leaving home to go to school and then playing at school.
2) Drawing a series of scenes in comic strip form.

Name:______________________ Date:______________________

Concept: COLOR No. of Observation:__________

Rating:

__________ 1. Spontaneous reaction to color.

__________ 2. Observing others' use of or choosing of colored materials.

__________ 3. Shows preference for a specific color in a specific situation.

__________ 4. Matches color used by another person.

__________ 5. Chooses a variety of color for his work.

__________ 6. Selects colored object on request.

__________ 7. Names color of objects on request.

__________ 8. Chooses realistic colors for drawings.

__________ 9. Names blends of colors in describing colored objects.

Example of child's behavior supportive of this rating:

Name: ______________________________ Date: ____________________________

Concept: FORM-SPACE No. of Observation: ____________

Rating:

__________ 1. Non-Continuous Usage of objects or line (Exploration and trial and error).

__________ 2. Intentional representation of objects and/or line.

__________ 3. Articulation of interrelated objects and/or line.

__________ 4. Filling of space with intentional representation of objects and/or line.

__________ 5. Delimitation of space using object and/or line.

__________ 6. Proportional representation of object and/or line.

__________ 7. Angulation-differentiation between 90 degrees and other sized angles.

__________ 8. Three dimensional representations.

Example of child's behavior supportive of this rating:

Name: ______________________________ Date: __________________________

Concept: GROUPING No. of Observation: ___________

Rating:

__________ 1. Selects from available materials some related items for play (objects related to one another).

__________ 2. Placing object in appropriate location in the classroom.

__________ 3. Intentional pairing of objects or events related on the basis of perceptual qualities.

__________ 4. Intentional pairing of a linguistic symbol with the related object or events (symbol for some thing).

__________ 5. Logical grouping in context.

__________ 6. Differentiating groups of objects or events by contrasting characteristics (nonverbal).

__________ 7. Matches, sorts or refers to objects on the basis of a similar underlying characteristic or function (Objects must be present).

__________ 8. Defines words in terms of characteristic or function.

__________ 9. Relates a single object to two or more classes.

__________ 10. Modifies a grouping concept in light of new experience.

Example of child's behavior supportive of this rating:

Name:__________________________ Date:__________________________

Concept: ORDERING No. of Observation:______________

Rating:

__________ 1. Rote counting of objects.

__________ 2. Rank ordering of a set of objects along a previously determined dimension.

__________ 3. Rank ordering of a set of objects on a personally determined dimension.

__________ 4. Recongition of number as representative of increasing quantity up to 5.

__________ 5. Understands greater than and less than in numbers.

__________ 6. Understands concepts of equal units.

__________ 7. Recognition of number as representative of increasing quantity beyond 5.

__________ 8. Arithmetic operations with numbers 10 and beyond.

__________ 9. Rank ordering of objects or events within a general class.

Example of child's behavior supportive of this rating:

Name: ______________________________ Date: ___________________________

Concept: TIME SEQUENCE No. of Observation: _____________

Rating:

__________ 1. Imitates teacher's established order within a single class event.

__________ 2. Has learned to follow teacher's established order within a single class event.

__________ 3. Tells a sequential story or verbalizes about a sequence of events.

__________ 4. Uses time words.

__________ 5. Verbalizes about the sequence of routine class events.

__________ 6. Understands the use of time words.

__________ 7. Arranges pictures in sequence to tell a story.

__________ 8. Refers to sequence of future events.

__________ 9. Draws simple sequence of events in pictures.

Example of child's behavior supportive of this rating:

Name:________________________________ Date:________________________

Concept: TIME DURATION No. of Observation:___________

Rating:

_________ 1. Adjusts his activity to meet the time demand.

_________ 2. Verbalizations about his adjustments to time demand.

_________ 3. Verbalizations about passages of periods of time.

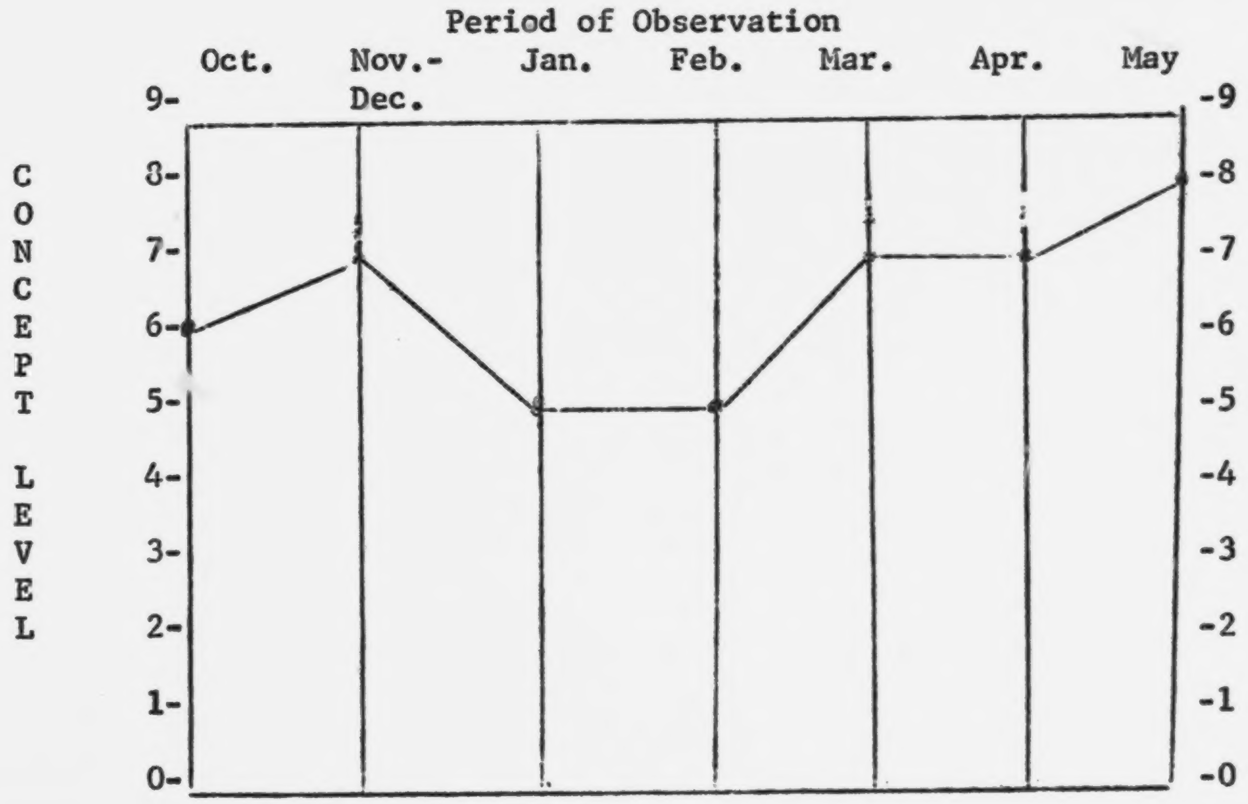
Example of child's behavior supportive of this rating:

APPENDIX B

Charts XIX through XXIV
related to median scores in
subject attainment for all
extensive subjects during
kindergarten.

CHART XIX

Pattern of Median Scores in Attainment
of Color Concept for All Extensive
Subjects during Kindergarten.

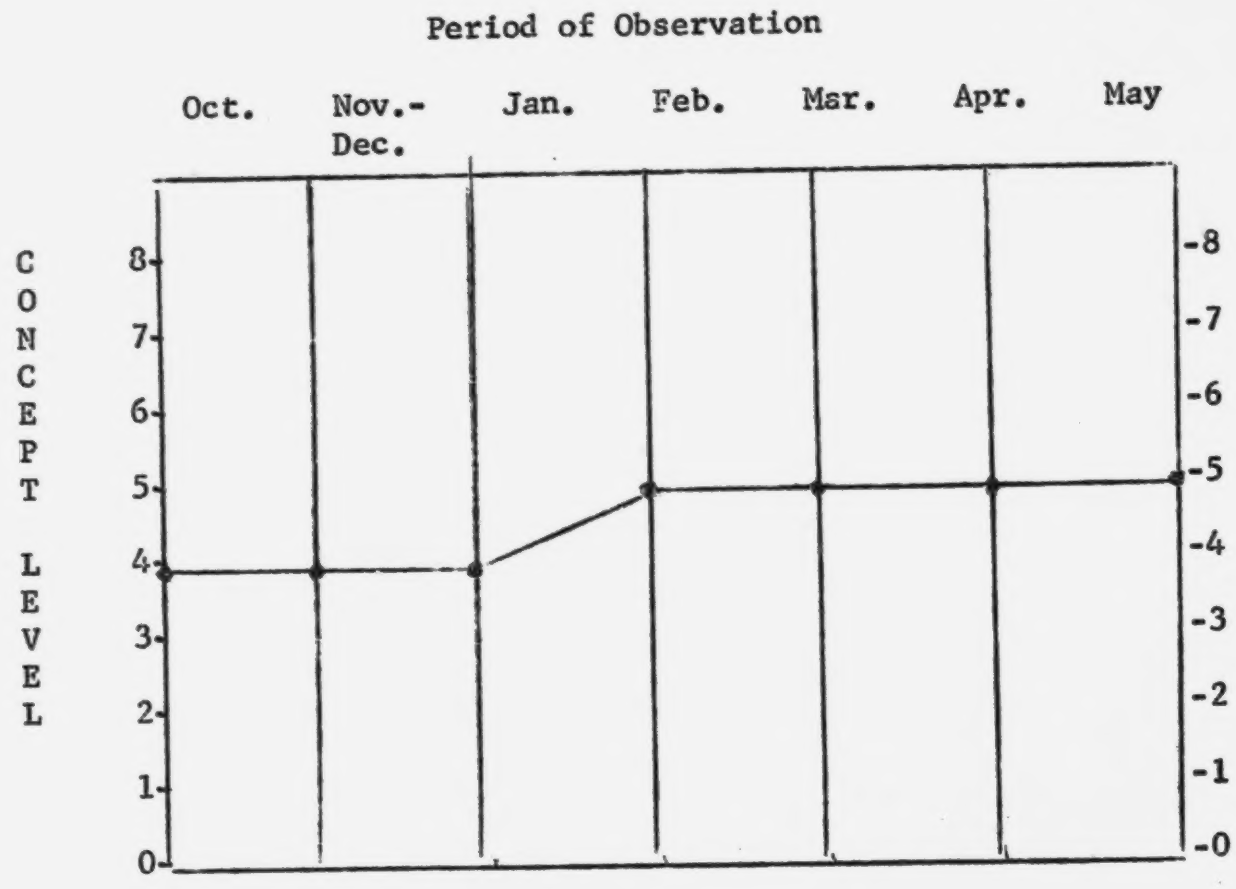


[a] Rated	180	176	175	164	162	149	169
Total Available	199	199	193	193	193	193	193

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XX

Pattern of Median Scores in Attainment of Form-Space Concept for All Extensive Subjects during kindergarten.

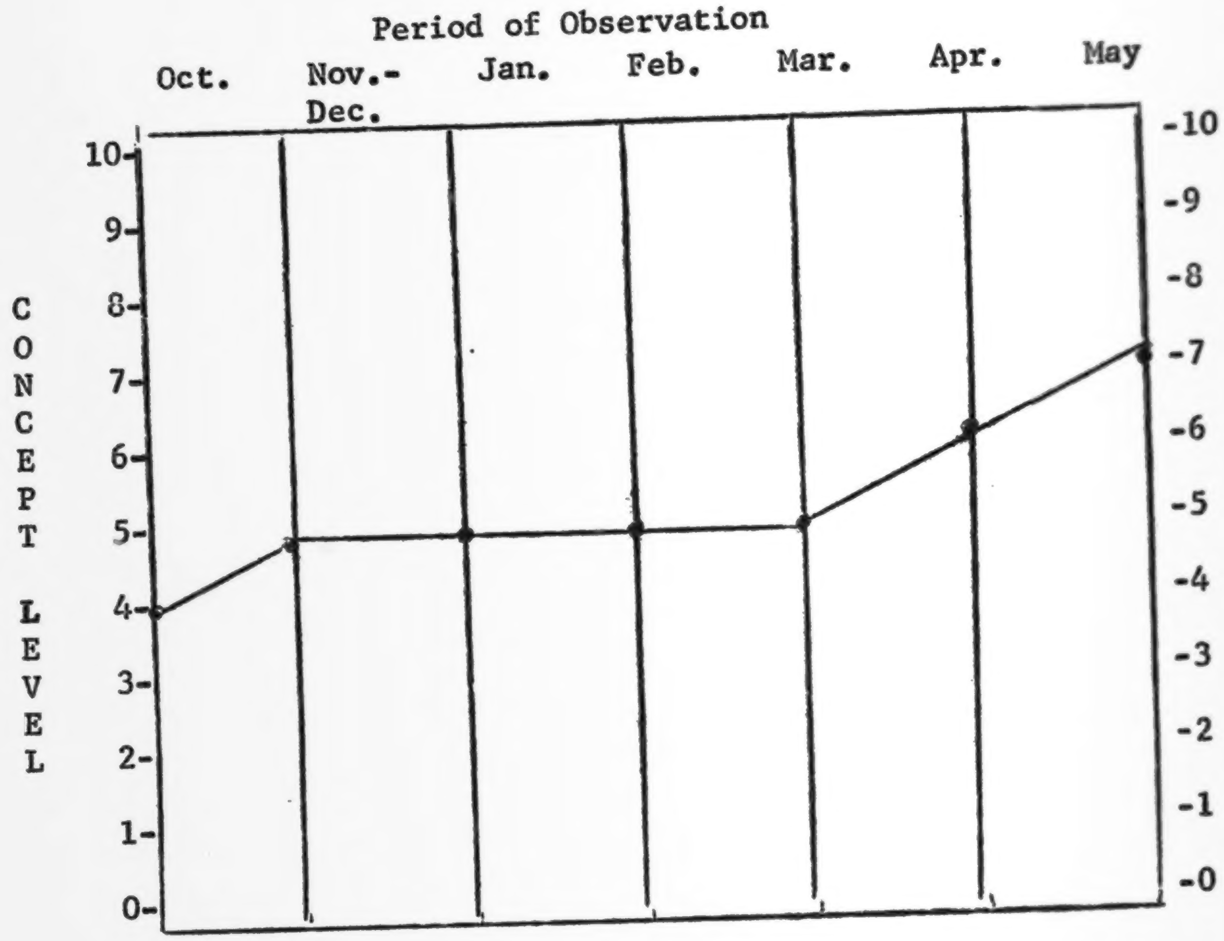


	Oct.	Nov.-Dec.	Jan.	Feb.	Mar.	Apr.	May
[a]Rated	180	169	174	166	168	146	166
Total Available	199	199	193	193	193	193	193

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XXI

Pattern of Median Scores in Attainment of Grouping Concept for All Extensive Subjects during Kindergarten.

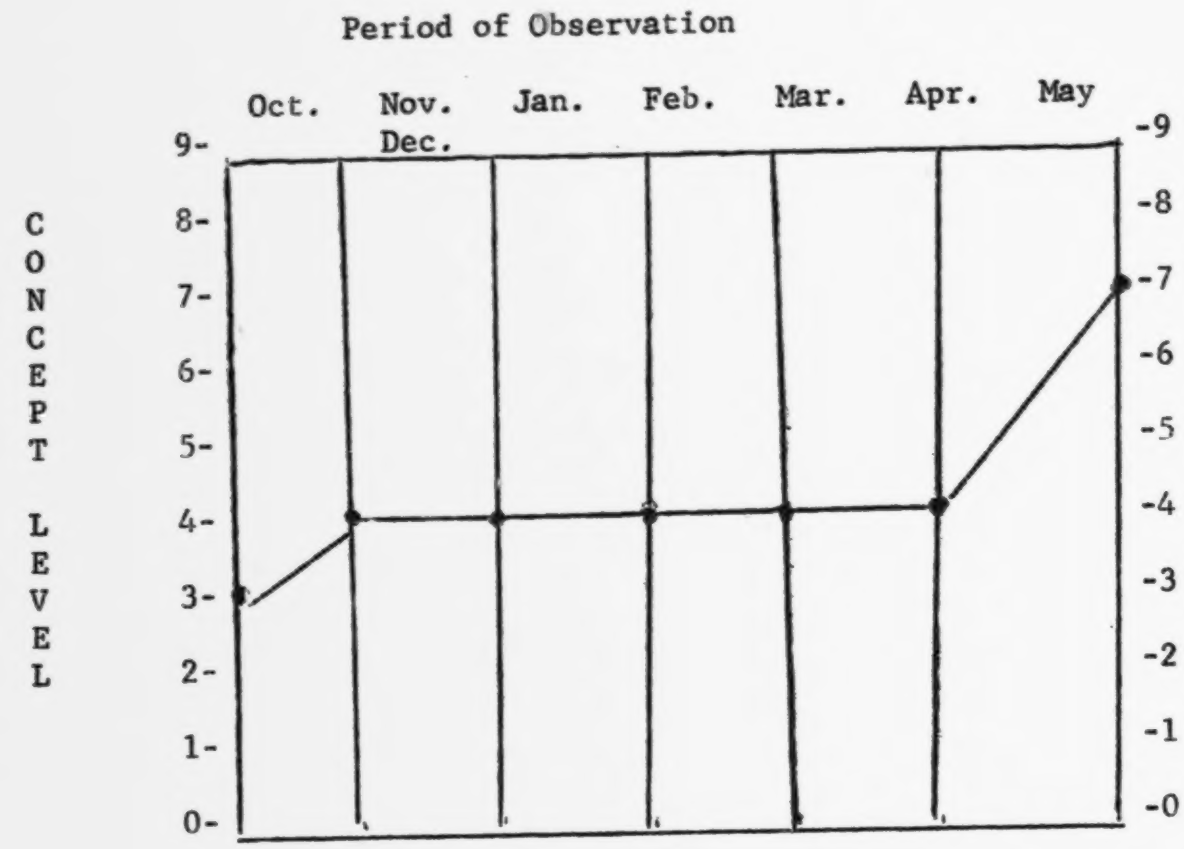


Rated[a]	178	189	173	172	170	151	168
Total Available	199	199	193	193	193	193	193

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XXII

Pattern of Median Scores in Attainment of Ordering Concept for All Extensive Subjects during Kindergarten.

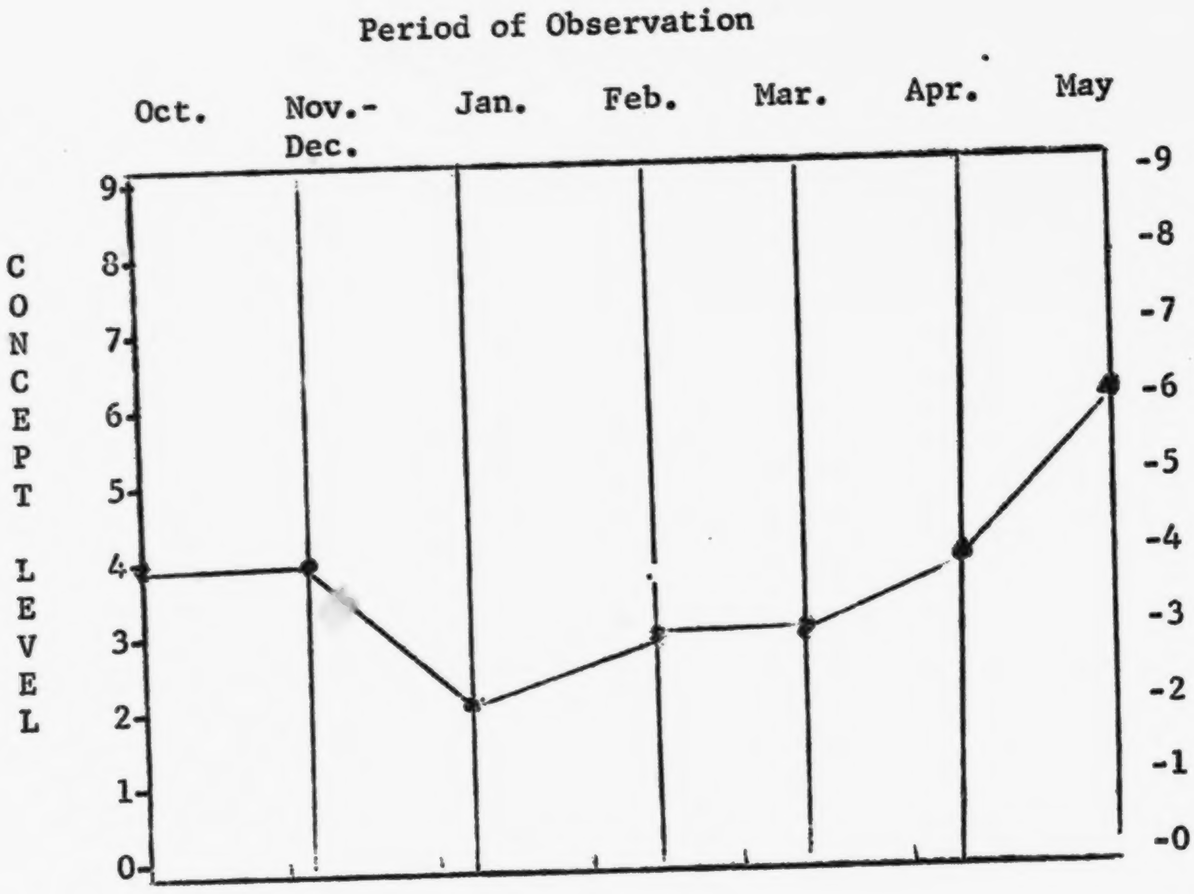


[a]Rated	171	149	165	139	136	121	163
Total Available	199	199	193	193	193	193	193

[a]The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XXIII

Pattern of Median Scores in Attainment of Time Sequence Concept for All Extensive Subjects during kindergarten.

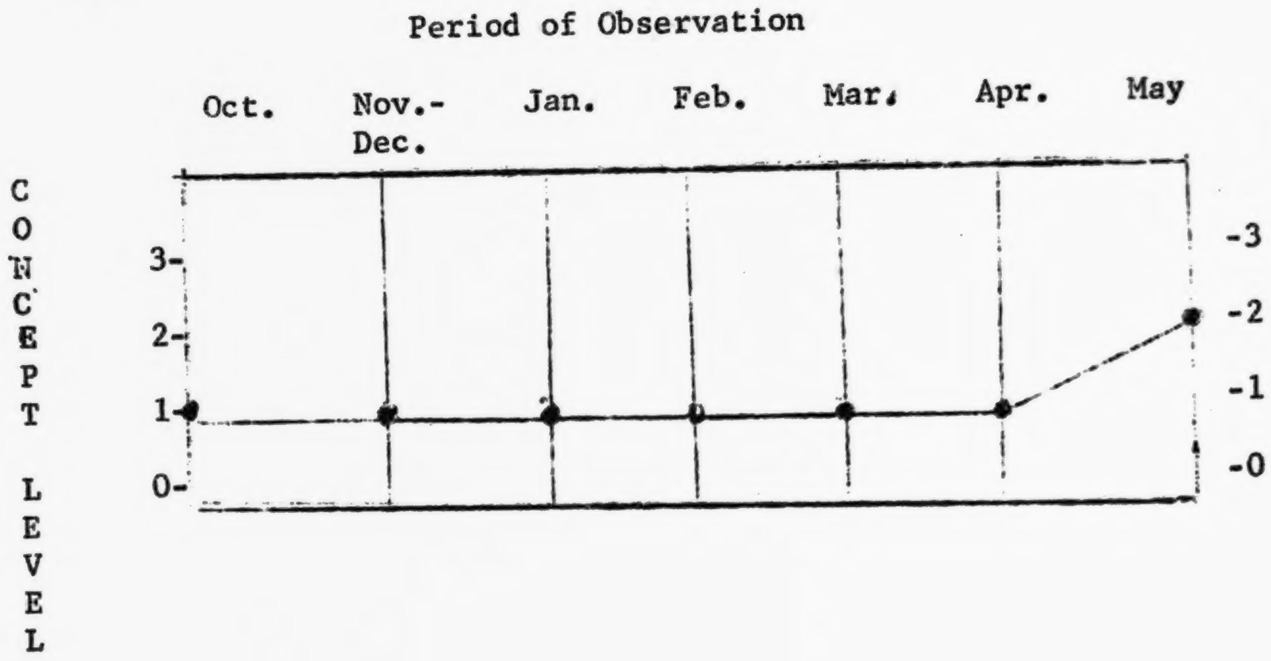


aRated	177	172	174	171	167	143	166
Total Available	199	199	193	193	193	193	193

[a] The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.

CHART XXIV

Pattern of Median Scores in Attainment of Time Duration Concept for All Extensive Subjects during kindergarten.



[a]Rated	170	150	145	138	138	126	158
Total Available	199	199	193	193	193	193	193

[a]The total rated departs from total available because of long illnesses of children, insufficient data to make rating, and occasional difficulties of observers in scheduling their observations.